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PETROLEUM ASSOCIATION FOR CONSERVATION OF THE CANADIAN ENVIRONMENT
ASSOCIATION PETROLIÈRE POUR LA CONSERVATION DE L'ENVIRONNEMENT CANADIEN

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COMPARISON OF THE EFFLUENT MONITORING REQUIREMENTS FOR SPECIFIC U.S. PETROLEUM REFINERIES TO PROPOSED ONTARIO MINISTRY OF THE ENVIRONMENT REGULATIONS

"Working for a Better Environment"

COMPARISON OF THE EFFLUENT MONITORING REQUIREMENTS FOR SPECIFIC U.S. PETROLEUM REFINERIES TO PROPOSED ONTARIO MINISTRY OF THE ENVIRONMENT REGULATIONS

PACE REPORT NO. 88-4

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ABSTRACT

The draft effluent monitoring regulations for petroleum refineries issued by Ontario's Ministry of the Environment (MOE) were compared to U.S. Environmental Protection Agency (U.S. EPA) recommendations and National Pollutant Discharge Elimination System (NPDES) permits for 34 petroleum refineries in states surrounding the Great Lakes. Major differences in the number and frequency of parameters monitored between U.S. EPA guidelines, MOE draft regulations, and individual NPDES permits were noted.

MOE draft regulations require each facility to chemically characterize its process effluents by monitoring for 155 parameters once every 3 years. Additional monitoring consists of monitoring for 110 chemicals three times quarterly, 12 chemicals three times weekly, and three chemicals daily.

In contrast, U.S. EPA requires each petroleum refinery to chemically characterize its process effluents by monitoring for 75 parameters once every 5 years as a part of its NPDES permit application/renewal. Based on data developed during this NPDES permit renewal process, permit limits are derived by the U.S. EPA and the state permitting authority.

Of all the facilities surveyed, only 92 of the 155 compounds required to be monitored by MOE were monitored by at least one U.S. facility. Of these compounds, 36 were monitored at a frequency equal to or greater than that established by MOE; this results in 119 of 155 draft MOE parameters monitored at a greater frequency than the most stringent permit requirement found in the 34 NPDES permits surveyed. Of the 110 chemicals required to be monitored quarterly by MOE, only nine are monitored at this frequency or greater by more than 50 percent of the U.S. facilities surveyed. Furthermore, only six chemicals of the 12 required to be monitored on a weekly basis by MOE and two of the three chemicals required to be monitored daily by MOE are monitored at this frequency by more than 50 percent of the U.S. facilities surveyed.

Although two states (Ohio and Illinois) were identified with a substantial organics monitoring program, the monitoring requirements identified for the facilities surveyed are subject to modification based on the results of monitoring program.

In general, most states in this survey focus on monitoring conventional and nonconventional pollutants (e.g., pH, TSS, BOD, etc.) as opposed to organic priority pollutants.

RESUME

Le règlement provisoire concernant la surveillance des effluents des raffineries de pétrole publié par le Ministère de l'environnement de l'Ontario (MEO) a été comparé aux lignes directrices recommandées par la U.S. Environmental Protection Agency (EPA) et les permis du National Pollutant Discharge Elimination System accordés à 34 raffineries de pétrole américaines situées en bordure des Grands lacs. Des différences majeures dans le nombre de paramètres à surveiller et la fréquence de surveillance exigée par les lignes directrices de l'EPA, le règlement provisoire du MEO et les permis individuels du NPDES ont été constatées.

Le règlement provisoire du MEO exige que chaque installation effectue une caractérisation chimique des effluents de procédé comportant la surveillance de 155 paramètres une fois tous les trois ans. Il est exigé en outre que 110 substances chimiques soient surveillées trois fois par trimestre, que 12 soient surveillées trois fois par semaine et que trois le soient quotidiennement.

Par contraste, l'EPA exige de chaque raffinerie de pétrole une caractérisation chimique de ses effluents de procédés qui consiste à surveiller 75 paramètres, une fois tous les cinq ans, dans le cadre du processus de renouvellement des permis du NPDES. Les limites imposées par les permis sont établies par l'EPA et l'Etat émetteur de permis en fonction des données établies dans le cadre de ce processus de renouvellement.

Des 155 composés dont le règlement ontarien exige une surveillance, seulement 92 étaient surveillés par au moins une des installations américaines étudiées. De ces composés, 36 faisaient l'objet d'une surveillance de fréquence au moins égale à celle qu'exige le MEO. Il en résulte que 119 des 155 paramètres stipulés par le règlement provisoire du MEO sont surveillés à une fréquence supérieure aux exigences les plus rigoureuses stipulées dans les 34 permis du NPDES étudiés. Des 110 substances chimiques dont le MEO exige une surveillance trimestrielle, seulement neuf sont surveillées à au moins cette fréquence par plus de 50 pour cent des installations américaines étudiées. En outre, seulement six des 12 substances chimiques dont

le MEO exige une surveillance hebdomadaire et deux des trois substances chimiques dont le MEO exige une surveillance quotidienne sont surveillées à au moins ces fréquences par plus de 50 pour cent des installations américaines. Deux Etats (Ohio et Illinois) gèrent des programmes substantiels de surveillance des composés organiques. Cependant, les exigences de surveillance imposées aux installations étudiées sont susceptibles d'être modifiées en fonction des résultats du programme de surveillance.

En général, la plupart des Etats visés par cette enquête se concentrent sur la surveillance des polluants conventionnels et non conventionnels (p. ex., pH, DBP, TSS, etc.), par opposition aux polluants organiques prioritaires.

EXECUTIVE SUMMARY

The Ministry of the Environment (MOE) of Ontario issued draft effluent monitoring regulations for the petroleum refinery industry on July 31, 1987. In this report they are compared with those of 34 United States petroleum refineries located in states adjacent to the Great Lakes.

The Ontario regulations provide lists of chemicals and physical parameters to be monitored, the frequency and locations of monitoring, guidelines for effluent toxicity testing, and descriptions of required sampling and analytical methods.

Recommended U.S. Environmental Protection Agency (U.S. EPA) guidelines and individual National Pollutant Discharge Elimination System (NPDES) permit limits were directly compared to the Ontario draft.

Major differences between U.S. and Ontario documents were:

- MOE requires a chemical characterization of process effluents once every 3 years by monitoring for 155 compounds. U.S. EPA requires a chemical characterization of effluents by monitoring for 75 compounds only once every 5 years as a part of the NPDES permit renewal process.
- In the United States, data developed through the chemical characterization process are used by U.S. EPA and the state permitting authority in order to set NPDES permit limits.
- Of the 155 parameters required to be monitored by MOE, only 92 were monitored by at least one of the facilities surveyed.
- 119 of the 155 MOE parameters are monitored at a frequency greater than the most stringent limit in the NPDES permits surveyed.

- MOE requires monitoring three times quarterly for 110 chemicals, three times weekly for 12 chemicals, and daily for three chemicals. Of the 110 chemicals required to be monitored quarterly by MOE, only nine are monitored at this frequency or greater by more than 50 percent of the U.S. facilities surveyed. Furthermore, only six chemicals of the 12 required to be monitored on a weekly basis by MOE and two of the three chemicals required to be monitored daily by MOE are monitored at these frequencies or greater by more than 50 percent of the U.S. facilities surveyed.

In addition to evaluating regulations for process effluents, storm and cooling water permits, sampling and analytical requirements, and toxicity testing regulations were also compared.

For storm and cooling water requirements, MOE draft effluent monitoring regulations and permit limits identified for the 34 NPDES permits surveyed are similar in that a minimal number of parameters are required to be monitored. Similarly, few differences were noted between MOE and U.S. EPA sampling and analytical requirements.

For toxicity, MOE's draft regulation requires monthly static acute toxicity testing on each process outfall and quarterly static acute testing on each cooling water outfall. In contrast, none of the 34 permits surveyed had specific toxicity test requirements.

The primary differences noted in this review between MOE draft effluent monitoring regulations, U.S. EPA guidelines, and the 34 NPDES permits for petroleum refineries surveyed are found in the number and frequency of parameters monitored. This is expected to result in a considerably higher cost for the proposed MOE monitoring program than for the U.S. refineries reviewed.

SOMMAIRE

Le Ministère de l'environnement de l'Ontario (MEO) a publié le 31 juillet 1987 un règlement provisoire concernant la surveillance des effluents des raffineries de pétrole. Dans ce rapport, ce règlement est comparé à ceux qui sont imposés à 34 raffineries de pétrole américaines situées en bordure des Grands lacs.

Le règlement ontarien détaille les substances chimiques et les paramètres physiques à surveiller, la fréquence et les endroits où la surveillance doit s'effectuer, les lignes directrices concernant les tests de la toxicité des effluents à effectuer et les descriptions des méthodes d'échantillonnage et d'analyse exigées.

Les lignes directrices recommandées de la U.S. Environmental Protection Agency (EPA) et les limites imposées par les permis individuels du National Discharge Elimination System (NPDES) ont été comparées au règlement provisoire du MEO.

Les principales différences discernées entre les documents américains et ontariens sont les suivantes:

- le MEO exige une caractérisation chimique des effluents de procédé comportant la surveillance de 155 composés tous les trois ans. L'EPA exige une caractérisation chimique des effluents comportant seulement 75 composés tous les cinq ans, dans le cadre du processus de renouvellement des permis du NPDES;

- aux Etats-Unis, les données établies par la voie du processus de caractérisation chimique sont utilisées par l'EPA et l'Etat émetteur de permis pour établir les limites imposées par le permis;

- des 155 paramètres dont le règlement ontarien exige une surveillance, seulement 92 étaient surveillés par au moins une des installations américaines étudiées;

- pour 119 des 155 paramètres stipulés par le MEO la fréquence de surveillance est supérieure à celle exigée par la plus stricte limite imposée par les permis du NPDES;

- le MEO exige que 110 substances chimiques soient surveillées trois fois par trimestre, que 12 soient surveillées trois fois par semaine et que trois le soient quotidiennement. Des 110 substances chimiques dont le MEO exige une surveillance trois fois par trimestre, seulement neuf sont surveillées à au moins cette fréquence par plus de 50 pour cent des installations américaines étudiées. En outre, seulement six des 12 substances chimiques dont le MEO exige une surveillance hebdomadaire et deux des trois substances chimiques dont le MEO exige une surveillance quotidienne sont surveillées à au moins ces fréquences par plus de 50 pour cent des installations américaines étudiées.

En plus de l'évaluation des règlements concernant les effluents de procédé, on a également effectuer une comparaison des permis relatifs aux eaux pluviales et de refroidissement, des exigences en matière d'échantillonnage et d'analyse et des règlements sur les tests de toxicité.

Pour ce qui est des exigences relatives aux eaux pluviales et de refroidissement, le règlement provisoire concernant la surveillance des effluents émis par le MEO et les limites établies par les 34 permis de NPDES examinés sont semblables en ce sens qu'il est exigé de surveiller un nombre minimum de paramètres. De façon semblable, on a constaté très peu de différences entre les exigences relatives à l'échantillonnage et à l'analyse imposées par le MEO et l'EPA.

En ce qui concerne la toxicité, le règlement provisoire du MEO exige l'exécution de tests mensuels de toxicité aiguë à chaque sortie d'effluent de procédé et de tests trimestriels de toxicité aiguë à chaque sortie d'eaux de refroidissement. Par contraste, aucun des 34 permis étudiés ne comportait des exigences de tests de toxicité précis.

Les principales différences discernées par cette étude entre le règlement provisoire du MEO concernant la surveillance des effluents, les lignes directrices de l'EPA et les 34 permis du NPDES émis aux raffineries de pétrole étudiées se rapportent au nombre de paramètres surveillés et à la fréquence de la surveillance. Cette constatation donne lieu à croire que le programme de surveillance proposé par le MEO entraînera des coûts sensiblement plus élevés que ceux des raffineries américaines étudiées.

1. INTRODUCTION

Under the provisions of Section 136 of the Environmental Protection Act, Ontario's Ministry of the Environment (MOE) issued draft effluent monitoring regulations for the petroleum refinery industry on 31 July 1987. These regulations provide lists of chemicals and physical parameters to be monitored, the frequency and locations of monitoring, guidelines for effluent toxicity testing, and descriptions of required sampling and analytical protocols.

The Petroleum Association for Conservation of the Canadian Environment (PACE) contracted EA Engineering, Science, and Technology, Inc. to examine these draft regulations, and compare Ontario's proposed effluent monitoring requirements with those existing at United States petroleum refineries located in states adjacent to the Great Lakes. United States Environmental Protection Agency (U.S. EPA) Regions II, III, and V were contacted to obtain copies of all NPDES permits for refineries within their areas, as were appropriate environmental agencies in Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. This effort resulted in the receipt of 34 permits within Standard Industrial Classification 2911 (Petroleum Refining Industry). A list of the permits received is presented on Table 1-1. EA believes that the permits reviewed in this study include all of the "major" refinery permits which have been issued within this eight-state area. This report presents the results and conclusions of this comparative study.

TABLE 1-1 LIST OF PETROLEUM REFINERIES BY STATE

ID Number	State/Petroleum Refinery	Discharge to Great Lakes Basin?
	Wisconsin	
1	Murphy Oil USA, Inc.	Yes
	Minnesota	
2	Ashland Oil	
3	Koch Refining Company	
	Michigan	
4	Lakeside Refining Company	Yes
5	Total Petroleum, Inc.	Yes
6	Mobil Oil, Woodhaven Lube Plant and Terminal	Yes
	Ohio	
7	Ashland Oil	
8	Sun Refining and Marketing	Yes
9	Standard Oil, Lima	
10	Standard Oil, Toledo	Yes
11	Chevron, Inc.	
	Illinois	
12	Marathon Petroleum Company	
13	Clark Oil and Refining Corp.	
14	Shell Oil Company	
15	Mobil Oil Corp.	
16	Texaco Refining and Marketing, Lockport	Yes
17	Union Oil Company	Yes
18	Texaco, Inc.	
	Indiana	
19	Laketon Refining Corp.	
20	Indiana Farm Bureau Cooperative Assoc.	
21	Amoco Oil Company	Yes
	Pennsylvania	
22	Breslube-Penn, Inc.	
23	Agway Petroleum Corp.	
24	BP Oil	
25	Gulf Oil Corp., Philadelphia	
26	United Refining Company	
27	Witco Chemical Corporation	
28	Witco Petrolia Plant	
29	Gulf Oil Corp.	
30	Pennzoil Company	
31	Quaker State, Emlenton	
32	Quaker State, Keating	
33	Penreco	
34	Ashland Petroleum	

2. MONITORING PARAMETERS AND FREQUENCY

The U.S. EPA and MOE have employed similar approaches to petroleum refinery discharge regulations. Although many of the same parameters are analyzed, the frequency of many of these analyses differs significantly. These two regulatory approaches are analyzed in the following manners:

- U.S. EPA and MOE permit monitoring requirements are directly compared (Section 2.1).
- Recommended U.S. EPA guidelines are compared to actual National Pollutant Discharge Elimination System (NPDES) permits for individual petroleum refineries in states surrounding the Great Lakes (Section 2.2).
- MOE requirements are compared to actual Great Lakes region petroleum refinery NPDES permits (Section 2.3).
- Intrastate and interstate permit differences are noted (Section 2.4).
- Great Lakes drainage basin permits versus other nondrainage basin permits are compared (Section 2.5).
- Worst-case permit requirements are analyzed (Section 2.6).
- Chemical-specific worst-case requirements are analyzed (Section 2.7).

2.1 U.S. EPA vs. MOE REQUIREMENTS FOR PROCESS WATER

MOE monitoring requirements for petroleum refineries will consist of several important components: characterization, routine monitoring, toxicity testing, flow measurement, and sampling and analytical requirements. During the effluent characterization process, traditional conventional pollutants and a select group of pollutants from the Effluent

Monitoring Priority Pollutant list are identified and quantified. This characterization procedure is to be performed after a significant process change or once every three years for all process water outfalls and requires monitoring a minimum of 24 groups of compounds containing 155 individual chemicals. Routine monitoring consists of daily, weekly, and quarterly monitoring for subsets of the annual monitoring list. This component requires monitoring three times quarterly for 110 chemicals, three times weekly for 12 chemicals, and daily for 3 chemicals, and is performed to provide an indication of annual loadings and potential problems in the receiving waterbody. Note, the draft regulations contain a clause which will allow for modification of the chemical monitoring list after a period of one year. The biomonitoring component involves performing a static 96-hour LC50 toxicity test on rainbow trout at each process outfall on a monthly basis and at each cooling water outfall on a quarterly basis. Finally, the flow component requires continuous flow monitoring at all sampling points where effluent limits will be imposed as a minimum requirement.

In contrast to MOE's extensive characterization and routine monitoring scheme, U.S. EPA requires a toxic pollutant evaluation once every 5 years [Appendix Table A-1, 40 CFR 122.46]. This evaluation, performed as part of the NPDES application procedure, ensures that permitting authorities receive adequate information on the presence of pollutants in a discharge. However, U.S. EPA is cautious to point out that "the information supplied in the application does not automatically trigger the establishment of an effluent limitation," but rather provides the permitting authority with enough information to develop sound effluent limits [49 Fed. Regist. 38001].

U.S. EPA's NPDES permit application and renewal forms request general information such as industry type, location, and size, and requests information concerning effluent characterization [40 CFR 122.21(g) and Form 2-C, Part V-C]. A copy of application Form 2-C can be found in Appendix A. For each outfall, all applicants must report quantitative data for:

- Biochemical Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Total Organic Carbon (TOC)
- Total Suspended Solids (TSS)
- Ammonia as N
- Temperature
- pH

In addition to these basic requirements, all applicants must provide information on the presence of toxic pollutants [40 CFR 122.21(g)(7)(i)-(iii)]. U.S. EPA acknowledges the cost and burden of requiring each applicant to monitor for every pollutant and states "It is unnecessary to require all applicants to test for all pollutants" [49 Fed. Regist. 38001]. Because petroleum refining is defined as a primary industry, all process discharges must be analyzed for the presence of metals, cyanides, and total phenols [40 CFR 122.21(g)(7)(ii), Item V-C of Form 2-C]. This amounts to analyzing for 15 pollutants every five years. Additionally, of the four organic priority pollutant fractions [volatiles (28 chemicals), acids (11 chemicals), base/neutrals (46 chemicals), and pesticides (25 chemicals)], petroleum refineries must only analyze for the volatile fraction. Prior to 1981, petroleum refineries were required to analyze for all four fractions, but this testing requirement was deleted in 1981 [46 FR 35090, 7 July 1981]. Currently, each petroleum refinery must analyze for 75 chemicals (7 traditional, 24 pollutants of group V-B in Form 2-C, dioxin, 15 metals/phenols/cyanide, 28 volatile organics) every 5 years as part of the permit renewal process. Although each petroleum refinery is required to monitor for 24 pollutants in Item V-B of the NPDES renewal Form 2-C, the monitoring requirement for specific chemicals in this group may be waived if supported by data from appropriate sources (i.e., other petroleum refineries) [49 Fed. Regist. 38001]. For all compounds in this category, the applicant must note whether the compound is believed to be present or believed to be absent. For those believed to be present, the applicant must provide quantitative data or explain why and at what levels the compound is expected to be in the discharge. For those not believed present, the applicant must provide evidence why the compound is not expected in the effluent. Overall, the 75 chemicals required to be monitored every 5 years as part of NPDES application/renewal can be reduced.

Although each facility is not required to monitor each pollutant in each organic fraction, all industrial dischargers must report quantitative data for any toxic pollutant that is known or believed to be present in a discharge above 10 ug/L [40 CFR 122.21(g)(7)(iii)(B)]. However, if a constituent is known to be present, but concentrations are expected to be less than this threshold value, the discharger must briefly describe why the pollutant is in the discharge. This threshold value was developed in an effort to eliminate testing for a pollutant discharged in extremely small amounts, yet provides the permit writer with sufficient information to identify the presence of pollutants which should be controlled through permit limitations (49 Fed. Regist. 38002). Originally this threshold value was proposed at 100 µg/L and was based on GC/MS Methods 624 and 625 detection limits of 10 µg/L multiplied by a factor of 10 as a rough measure of analytical variability. However, because U.S. EPA's water quality criteria indicate that many pollutants cause adverse impact to aquatic organisms and to human health at or below 100 µg/L, the threshold value was lowered to 10 µg/L (49 Fed. Regist. 38002). EPA has since retained this threshold level because it is "set at a level where the data are sufficiently accurate to be useful and the value of the data is not outweighed by the burden of testing imposed on the applicant" (49 Fed. Regist. 38002). EPA further states:

> The threshold level does not mean that permit limitations should necessarily be set for all pollutants present at 10 ppb, nor that it may never be appropriate to set limitations below this level. The submission of data, whether under § 122.21 (g)(7)(iii), (g)(7)(ii) (CFR § 122.53(d)(7)(iii), (ii) (for specified GC/MS fractions), or otherwise, does not automatically trigger the establishment of effluent limitations for the pollutants reported. Before setting technology-based limitations on pollutants present in the discharger's effluent at any level, the permit writer must consider whether the appropriate technology can reduce the pollutants in question to that level, and whether the analytical uncertainty and variability that may exist are so significant that the imposition and enforcement of specific limitations at that level may be unreasonable. (49 Fed. Regist. 38005)

If acrolein, acrylonitrile, 2,4-dinotrophenol, or 2-methyl-4, 6-dinitrophenol are suspected to be present above 100 ug/L, these chemicals must also be quantified. In support of this, EPA states:

> For four toxic pollutants (acrolein, acrylonitrite, 2,4-dinitrophenol, and 2-methyl-4,6-dinitrophenol), EPA is establishing a higher application testing threshold of 100 ppb (EPA had proposed 500 ppb). The proposed GC/MS test methods indicate that two of these pollutants are detectable at 100 ppb and the others (the phenolic compounds) at 250 ppb. However, the same proposal indicated that both of the phenolic compounds were detectable using GC methods at levels well below 100 ppb (44 FR 69487, December 3, 1979). Thus if applicants expect concentration below the GC/MS detection limit, they can perform GC analysis to obtain the precise data. (49 Fed. Regist. 38003)

Appendix Tables A-1 through A-7 provide a side-by-side comparison of MOE and U.S. EPA monitoring requirements. The chemicals identified under the U.S. EPA column must be analyzed once every 5 years, whereas chemicals noted under MOE must be characterized once every three years or on a weekly, monthly, or quarterly basis. While U.S. EPA monitoring requirements are much less stringent, chemicals identified in a discharge during the application process are typically required to be monitored or reduced in concentration in the final permit.

2.2 U.S. EPA REQUIREMENTS vs. STATE PERMITS

Although U.S. EPA developed NPDES permit application requirements, the actual permitting program is administered primarily by the state with assistance from U.S. EPA. Section 123.25 of 40 CFR notes that "...states are not precluded from omitting or modifying any provisions to impose more stringent requirements." Therefore, each state must require effluent characterization as specified by U.S. EPA prior to granting a NPDES permit. Section 123.25 of 40 CFR also allows states to deal with each industry on a site-specific basis, provided the minimum requirements specified by U.S. EPA are followed. Several unique differences in the way states approach NPDES regulations are discussed below.

Although U.S. EPA has stated that petroleum refineries need only analyze for the seven traditional pollutants, 28 volatile organics, 24 group V-B pollutants plus dioxin, and 13 metals and cyanide and phenols, Ohio has required that each of the five refineries in that state monitor 16 polynuclear aromatic hydrocarbons, 27 purgeable halocarbons, 30 volatiles, 11 acids, and 45 base/neutral organics for one year on a quarterly, semiannual, or annual basis. The results of this organic pollutant monitoring program will then be reviewed, and Ohio EPA may propose effluent limitations, continue the monitoring program, or modify the program as appropriate. Similarly, Illinois EPA has required several of its refineries to monitor 12 polynuclear aromatic hydrocarbons and benzene, toluene, and ethylbenzene twice per year for one year. Illinois EPA will withdraw this monitoring requirement if the above pollutants "are not discharged in amounts which are of toxic significance to human health, or indigenous aquatic organisms...." Of Illinois' seven petroleum refineries, only three were required to monitor organic pollutants, and the pollutants monitored were not the same for each company.

Of the seven states reviewed, only Ohio and Illinois had a significant organic pollutant monitoring program, albeit a transitory one. Other states tended to require monitoring specific pollutants (i.e., Witco Petrolia in Pennsylvania was required to monitor monthly for tetrachloroethylene; Indiana Farm Bureau Cooperative Association was required to monitor weekly for chloroform). If monitoring was required for a specific pollutant (organic or metal), it was usually because the monitoring during NPDES permit application detected that pollutant. If no pollutants were detected, then no limits or monitoring requirements were implemented, as noted by this statement in Ashland Petroleum Company's Pennsylvania NPDES permit:

> The pollutants, which were found to be present in the petroleum category, SIC 2911, but were not limited by technology, were checked to ascertain whether they constituted a hazard to water quality. Since they didn't, they were not limited.

In conclusion, U.S. EPA has standardized the NPDES permit application process, yet each state has approached the regulation of petroleum refinery discharges on a facility-specific basis. Most states require a minimum amount of organic pollutant analysis, and focus on monitoring traditional pollutants such as BOD, pH, TSS, COD, NH^3-N, and temperature.

2.3 MOE REQUIREMENTS vs. STATE PERMITS

The differences between MOE monitoring requirements and state NPDES permit requirements for petroleum refineries are numerous (Table 2-1). There are several reasons for these differences. MOE requires a total characterization of a petroleum refinery's discharge once every three years, while U.S. petroleum refineries must only characterize their effluent prior to permit-renewal, which occurs at least once every five years. Using the information developed through the application process, each state is allowed to regulate companies on a site-specific basis. This leads to variability among and within the states in the regulation of petroleum refineries. While 3-year MOE and 5-year U.S. EPA requirements are fairly similar, routine state monitoring requirements are less stringent than proposed MOE requirements. MOE requires monitoring three times quarterly for 110 chemicals, three times weekly for 12 chemicals and daily for three chemicals. Of the 110 chemicals required to be monitored quarterly by MOE, only nine are monitored at this frequency or greater by more than 50 percent of the U.S. facilities surveyed. Furthermore, only six chemicals of the 12 required to be monitored on a weekly basis by MOE and two of the three chemicals required to be monitored daily by MOE are monitored at these frequencies or greater by more than 50 percent of the U.S. facilities surveyed. Even though U.S. EPA permits identify additional parameters not required by MOE, in general MOE requires more frequent monitoring of a greater number of pollutants.

Another important distinction between MOE monitoring requirements and requirements found in NPDES permits is the difference between quarterly monitoring frequencies. MOE requires analysis of three samples in a one-week period per quarter. This amounts to a total of 12 analyses per

TABLE 2-1 COMPARISON OF ONTARIO, U.S. EPA, AND ACTUAL U.S. PETROLEUM REFINERY MONITORING FREQUENCIES

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[b]	U.S. EPA	Percent of U.S. Petroleum Refinerie Surveyed That Monitor at or More Often Than the Given Frequencies[a] A (%)	2/A (%)	Q (%)	M (%)	≥ W (%)
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A				3	87
2	Cyanide	Cyanide	3/Q	5A					13
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A				3	90
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A				3	94
4b		Total kjeldahl nitrogen	3/Q	5A					
		Nitrate	3/Q	5A					
		Nitrite	3/Q	5A					
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q						
		Total organic carbon (TOC)	3/W	5A				3	
6	Total phosphorus	Total phosphorus	3/W	5A				3	6
7	Specific conductance	Specific conductance	3/Q						
8	Suspended solids	Total suspended solids (TSS)	3/W	5A				3	94
		Volatile suspended solids (VSS)	D						
9	Total metals	Aluminum	3/Q	5A					
		Beryllium	3/Q	5A					
		Cadmium	3/Q	5A					
		Chromium	3/Q	5A	10		3	3	74
		Cobalt	3/Q	5A					
		Copper	3/Q	5A				3	
		Lead	3/Q	5A				10	3
		Molybdenum	3/Q	5A					
		Nickel	3/Q	5A				3	
		Silver	3/Q	5A				3	
		Thallium	3/Q	5A					
		Vanadium	3/Q						
		Zinc	3/Q	5A				10	6

(a) A = annual; 2/A = twice per year; Q = quarterly; M = monitoring frequency is monthly or greater but less than weekly; ≥W = monitoring is weekly or greater.

(b) For some compounds, more than one monitoring frequency is identified by the MOE. The most frequent monitoring requirement is presented here.

TABLE 2-1 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[b]	U.S. EPA	Percent of U.S. Petroleum Refinerie Surveyed That Monitor at or More Often Than the Given Frequencies[a] A (%)	2/A (%)	Q (%)	M (%)	≥ W (%)
10	Hydrides	Antimony	3/Q	5A					
		Arsenic	3/Q	5A					
		Selenium	3/Q	5A				3	
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		6		3	3	74
12	Mercury	Mercury	3/Q	5A					
13	Total alkyl lead	Tetra-alkyl lead	3/Q						
		Tri-alkyl lead	3/Q						
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A				6	90
15	Sulphide	Sulphide	3/W					3	84
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	3/Q	5A		3	16		
		1,1,2-Trichloroethane	3/Q	5A		3	16		
		1,1-Dichloroethane	3/Q	5A		3	16		
		1,1-Dichloroethylene	3/Q	5A		19			
		1,2-Dichlorobenzene	3/Q			3	16		
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A		3	16		
		1,2-Dichloropropane	3/Q	5A		3	16		
		1,3-Dichlorobenzene	3/Q			3	16		
		1,4-Dichlorobenzene	3/Q			3	16		
		Bromoform	3/Q	5A		3	16		
		Bromomethane	3/Q	5A		3			
		Carbon tetrachloride	3/Q	5A		3	16		
		Chlorobenzene	3/Q	5A		3	16		
		Chloroform	3/Q	5A		3	16		3
		Chloromethane	3/Q	5A		3	16		
		Cis-1,3-Dichloropropylene	3/Q	5A		19			
		Dibromochloromethane	3/Q	5A		3	16		
		Dichlorobromomethane	3/Q	5A		3	16		
		Ethylene dibromide	3/Q						
		Methylene chloride	3/Q	5A		3	16		
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A		3	16	3	
		Trans-1,2-Dichloroethylene	3/Q	5A		19			
		Trans-1,3-Dichloropropylene	3/Q			3	16		
		Trichloroethylene	3/Q	5A		3	16		
		Trichlorofluoromethane	3/Q	5A					
		Vinyl chloride (Chloroethylene)	3/Q	5A		3	16		

TABLE 2-1 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[b]	U.S. EPA	Percent of U.S. Petroleum Refinerie Surveyed That Monitor at or More Often Than the Given Frequencies[a]				
No.	Name				A (%)	2/A (%)	Q (%)	M (%)	2 W (%)
17	Volatiles, Non-Halogenated	Benzene	3/W	5A		10	16		
		Ethylbenzene	3/W	5A		10	16		
		Methyl ethyl ketone	3/Q						
		Styrene	3/Q						
		Toluene	3/W	5A		10	16		
		o-Xylene	3/W						
		m-Xylene and p-Xylene	3/W						
18	Volatiles, Water Soluble	Acrolein	3A	5A					
		Acrylonitrile	3A	5A			6		
		1,3-Butadiene	3A						
19	Extractables, Base Neutral	Acenaphthene	3/Q			10	16		
		5-nitro Acenaphthene	3/Q						
		Acenaphthylene	3/Q			10	16		
		Anthracene	3/Q			10	16		
		Benz(a)anthracene	3/Q			10	16		
		Benzo(a)pyrene	3/Q			10	16		
		Benzo(b)fluoranthene	3/Q			10	16		
		Benzo(ghi)perylene	3/Q			10	16		
		Benzo(k)fluoranthene	3/Q			10	16		
		Camphene	3/Q						
		1-Chloronaphthalene	3/Q						
		2-Chloronaphthalene	3/Q		16	6			
		Chrysene	3/Q			10	16		
		Dibenz(a,h)anthracene	3/Q			10	16		
		Fluoranthene	3/Q			10	16		
		Fluorene	3/Q			10	16		
		Indeno(1,2,3-cd)pyrene	3/Q			10	16		
		Indole	3/Q						
		1-Methylnaphthalene	3/Q						
		2-Methylnaphthalene	3/Q						
		Naphthalene	3/Q			10	16		
		Perylene	3/Q						
		Phenanthrene	3/Q			10	16		
		Pyrene	3/Q			10	16		
		Benzyl butyl phthalate	3A			16	6		
		Bis(2-ethyhexyl) phthalate	3A			16	6		
		Di-n-butyl phthalate	3A			16	6		
		Di-n-octyl phthalate	3A			16	6		

TABLE 2-1 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[b]	U.S. EPA	Percent of U.S. Petroleum Refinerie Surveyed That Monitor at or More Often Than the Given Frequencies[a] A (%)	2/A (%)	Q (%)	M (%)	≥ W (%)
		4-Bromophenyl phenyl ether	3A		16	6			
		4-Chlorophenyl phenyl ether	3A		16	6			
		Bis(2-chloroisopropyl)ether	3A		16	6			
		Bis(2-chloroethyl)ether	3A		16	6			
		Diphenyl ether	3A						
		2,4-Dinitrotoluene	3A		16	6			
		2,6-Dinitrotoluene	3A		16	6			
		Bis(2-chloroethoxy)methane	3A		16	6			
		Diphenylamine	3A						
		N-Nitrosodiphenylamine	3A		16				
		N-Nitrosodi-n-propylamine	3A		16	6			
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q						
		2,3,4,6-Tetrachlorophenol	3/Q						
		2,3,5,6-Tetrachlorophenol	3/Q						
		2,3,4-Trichlorophenol	3/Q						
		2,3,5-Trichlorophenol	3/Q						
		2,4,5-Trichlorophenol	3/Q						
		2,4,6-Trichlorophenol	3/Q		16	6			
		2,4-Dimethyl phenol	3/Q		16	6			
		2,4-Dinitrophenol	3/Q		16	6			
		2,4-Dichlorophenol	3/Q		16	6			
		2,6-Dichlorophenol	3/Q		16	6			
		4,6-Dinitro-o-cresol	3/Q						
		2-Chlorophenol	3/Q		16	6			
		4-Chloro-3-methylphenol	3/Q						
		4-Nitrophenol	3/Q		16	6			
		m-Cresol	3/Q						
		o-Cresol	3/Q						
		p-Cresol	3/Q						
		Pentachlorophenol	3/Q		16	6			
		Phenol	3/Q		16	6			
21	Extractables, Phenoxy Acid Herbicides								
22	Extractables, Organochlorine Pesticides								

TABLE 2-1 (Cont.)

Analytical Test Group					Percent of U.S. Petroleum Refinerie Surveyed That Monitor at or More Often Than the Given Frequencies(a)				
No.	Name	Characterization Parameters	Ontario(b)	U.S. EPA	A (%)	2/A (%)	Q (%)	M (%)	≥ W (%)
23	Extractables, Neutral Chlorinated								
		1,2,3,4-Tetrachlorobenzene	3A			6			
		1,2,3,5-Tetrachlorobenzene	3A						
		1,2,4,5-Tetrachlorobenzene	3A						
		1,2,3-Trichlorobenzene	3A						
		1,2,4-Trichlorobenzene	3A		16				
		2,4,5-Trichlorotoluene	3A						
		Hexachlorobenzene	3A		16	6			
		Hexachlorobutadiene	3A		16	6			
		Hexachlorocyclopentadiene	3A		16				
		Hexachloroethane	3A		16	6			
		Octachlorostyrene	3A						
		Pentachlorobenzene	3A						
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans								
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A						
		Octachlorodibenzo-p-dioxin	3A						
		Octachlorodibenzofuran	3A						
		Total heptachlorinated dibenzo-p-dioxins	3A						
		Total hexachlorinated dibenzofurans	3A						
		Total hexachlorinated dibenzo-p-dioxins	3A						
		Total heptachlorinated dibenzofurans	3A						
		Total pentachlorinated dibenzo-p-dioxins	3A						
		Total pentachlorinated dibenzofurans	3A						
		Total tetrachlorinated dibenzo-p-dioxins	3A						
		Total tetrachlorinated dibenzofurans	3A						
25	Solvent Extractables	Oil and grease	3/W	5A				3	94
26	Fatty and Resin Acids								
27	PCBs	PCBs (Aroclors)	3A			6			
		Toxicity Testing	M						
		Flow	C	5A				3	94

year and has been implemented by MOE to address important considerations such as short-term and long-term variability. In contrast to this, quarterly monitoring requirements found in U.S. NPDES permits consist of a single grab or composite sample analysis per quarter. Following is a discussion of specific differences between MOE requirements and actual NPDES permits.

Oxygen Demand

Oxygen demand can be estimated by monitoring chemical oxygen demand (COD), biological oxygen demand (BOD), or total organic carbon (TOC). MOE requires frequent analysis of TOC (three/week) and only three times quarterly monitoring for COD. BOD monitoring is not required. U.S. refinery permits typically require frequent (weekly or greater) monitoring of COD and infrequent or no monitoring of TOC. BOD is typically only monitored every 5 years.

Cyanide

MOE requires quarterly monitoring of cyanide. U.S. firms are required to analyze for this parameter only once every 5 years as part of the NPDES application process (Form 2-C). If identified as a problem pollutant during that characterization, a monitoring requirement and effluent limit may be placed on the permit. However, relatively few permits (13 percent) require monitoring for cyanide monthly or annually. Several permits contained provisions for monitoring free cyanide. Considering this parameter as a part of total cyanide increased U.S. permits requiring this type of monitoring to 29 percent of all permits evaluated.

Nitrogen

MOE draft regulations require quarterly monitoring for nitrate, nitrite and total kjeldahl nitrogen; and three times per week for ammonia and ammonium. None of the U.S. permits reviewed required monitoring for nitrate, nitrite, or total Kjeldahl nitrogen. However, most of the permits required monitoring ammonia-nitrogen once per week or greater.

Additionally, U.S. EPA requests quantitative data on ammonia-nitrogen and only general information on nitrate-nitrite and total organic nitrogen content (Form 2-C, Part V-B).

Total Phosphorus

Standard Oil (Lima) and Sun Refining of Ohio required total phosphorus analysis twice per week and monthly, respectively. MOE requires monitoring three times per week for total phosphorus.

Specific Conductance

MOE draft regulations require quarterly monitoring for specific conductance. Neither U.S. EPA nor any of the states required monitoring specific conductance.

Total Metals

MOE draft regulations require monitoring quarterly for 13 different "total metals." While none of the U.S. permits evaluated required analysis of all of the metals listed under total metals, all but three of the permits required monitoring total chromium. Other than total chromium, there appeared to be no trend in which metals were monitored. Aluminum, arsenic, antimony, beryllium, cadmium, cobalt, copper, mercury, molybdenum, nickel, silver, thallium, vanadium, and total alkyl leads did not require monitoring in any of the permits reviewed. Only one permit required analysis for selenium.

Phenolics and Sulphide

Nearly all of the permits surveyed required monitoring for phenolics (90%) and sulphide (84%) at a frequency of weekly or greater.

Organics

MOE draft regulations require monitoring once every three years for a large number of organic chemicals. Of the seven states surveyed, only Ohio and Illinois had an organic monitoring program. Ohio required analysis for 23 of the 26 compounds in the halogenated volatiles category (MOE analytical test group 16), 3 of the 7 chemicals in the non-halogenated volatiles category (MOE analytical test group 17), 30 of the 39 chemicals in the base/neutral extractable category (MOE analytical test group 19), and 9 of the 20 chemicals in the acid extractable category (MOE analytical test group 20) at a frequency of quarterly, biannual, or annual for one year. With the exception of several base/neutral compounds, many of these compounds were monitored at the same frequency or less by U.S. facilities. Of the 72 organic pollutants (analytical test groups 16, 17, 18, 19, and 20) which are required to be monitored at a frequency of quarterly, Ohio facilities are required to monitor for 49 of these compounds at the same frequency or less. Upon review of the monitoring data, Ohio EPA may require facilities to collect additional data, or set permit limits, or modify the requirement. Similarly, Illinois required one facility to monitor the halogenated volatiles category, three facilities to monitor the extractable base/neutrals category, and two facilities to monitor several pollutants in the phenolics, extractable organochlorine pesticides, and neutral-chlorinated extractables categories. Illinois required monitoring for one year with two analyses per year and the "worst-case" Illinois permit required monitoring for 65 of the 95 chemicals in analytical test groups 16, 17, 18, 19, and 20. These monitoring requirements for these facilities are subject to modification based on the results of the monitoring program.

Overall, several plants were required to monitor specific organic pollutants (benzene, trichloroethylene, chloroform), and it is suspected that these requirements were based on NPDES permit-application data.

Toxicity

MOE draft regulations require monthly acute toxicity testing using rainbow trout. None of the U.S. permits examined required analysis of the effluent for toxicity. However, Form 2-C of the NPDES application requires that the permittee report any biological test for acute or chronic toxicity performed within three years prior to the NPDES application.

2.4 DIFFERENCES AMONG U.S. PERMITS

This section discusses the differences in effluent monitoring requirements for refineries within a single state (intrastate differences), and differences in general requirements between states (interstate differences). Note that the conclusions below are based on the information contained in Appendix Tables A-1 through A-7 and are by necessity quite subjective (e.g., consistent, fairly consistent, dissimilar).

Interstate Differences

Significant differences in monitoring requirements were noted between the seven states reviewed in this study. Review of the permit monitoring requirements summarized in Appendix Tables A-1 through A-7 indicates differences in the number and categories of parameters measured, and the monitoring frequency. Specifically, the total number of parameters requiring monitoring by Wisconsin's single refinery is 11, whereas Ohio and Illinois permits list 100 and 107 different parameters, respectively, among their refinery monitoring requirements. Current refinery permits in Minnesota, Michigan, Indiana, and Pennsylvania contain a maximum of 13, 14, 15, and 26 parameters, respectively. Monitoring frequencies for any given parameter range from continuous to weekly (pH), and from three times per week to monthly (phenolics).

Intrastate Differences

Five of the seven states examined have permits for more than one refinery discharging process water, allowing intrastate comparisons. Conclusions are presented for each state.

Indiana--The lists of monitoring parameters and frequency are both quite consistent among the three permitted facilities.

Illinois--Of the seven permits, two are quite dissimilar in that they require monitoring for a large number of organic contaminants. Those two, however, have similar monitoring parameters and frequency. The remaining five permits have similar requirements to each other, but do not have the same organics list as the other two.

Minnesota--Both permits are similar with regard to required parameters and frequency of monitoring.

Ohio--The five refineries are quite consistent in monitoring parameters and frequency.

Pennsylvania--For the 13 refineries, the lists of monitoring parameters are quite consistent, but the monitoring frequencies are fairly inconsistent.

In conclusion, intrastate monitoring requirements for petroleum refinery effluents differ between states. For example, requirements for facilities in Ohio are quite consistent, whereas facilities in Illinois may have significantly different requirements. Differences may result from the recognition of site-specific environmental conditions which may affect permit limits (e.g., dilution potential, water hardness, species composition).

2.5 GREAT LAKES DRAINAGE BASIN PERMITS

Of the nine petroleum refineries located within the Great Lakes drainage basin, seven discharge process waters (Appendix Table A-8). Although the seven permits generally do not contain monitoring requirements that differ significantly from other facilities within those states, three of the seven permits contain organic monitoring requirements. Therefore, 43 percent of the Great Lakes drainage basin permits require organic pollutant monitoring. However, this may be due to the inclusion of two Ohio petroleum refineries and one Illinois refinery. These two states already require all of their refineries (Ohio) or a specific few (Illinois) to perform organic monitoring for a period of 1 year. The monitoring program for these states consists of the following.

For Ohio facilities, effluent samples are to be taken quarterly for a period of 1 year and analyzed for polynuclear aromatic hydrocarbons, purgeable halocarbons, and benzene, toluene, and ethylbenzene. Additionally, two effluent samples are to be taken over the same 1-year period and analyzed for volatile, acid, and base/nuetral pollutants. Results of these analyses are to be reported within 60 days of sampling. After review of results, Ohio EPA may propose "effluent limitations for specific organic pollutants, or continue or modify the monitoring program as appropriate."

For specific Illinois facilities, two effluent samples per year are to be analyzed for polynuclear aromatic hydrocarbons and benzene, toluene, and ethylbenzene. After one year, Illinois EPA may withdraw the monitoring requirements if the permittee can demonstrate that the parameters analyzed for are not discharged in toxic amounts.

In conclusion, petroleum refineries discharging into the Great Lakes drainage basin are probably treated no differently than those discharging to other areas within their respective states.

2.6 MOST STRINGENT PERMIT REQUIREMENTS

Of the seven states containing petroleum refineries, the monitoring requirements established by Ohio are the most stringent. Probably the greatest difference between Ohio and other states surveyed is the presence of a formal organic pollutant monitoring program. Each refinery in Ohio must analyze once per quarter an identical group of compounds for one year. Instead of requiring quantitation of only the volatile organics, Ohio requires analysis for polynuclear aromatic hydrocarbons, purgeable halocarbons, acids, and base-neutrals. This monitoring program continues for one year, after which "the Ohio EPA may propose effluent limitations for specific organic pollutants, or continue or modify the monitoring program as appropriate." After the first year, few organic pollutants were observed in the discharges, and organic monitoring requirements were significantly modified on a facility-specific and chemcial-specific basis (Morrison, personal communication).

2.7 CHEMICAL-SPECIFIC WORST-CASE REQUIREMENTS

Appendix Table A-9 compares MOE and EPA monitoring requirements to the most stringent individual monitoring requirement for each parameter found in the 34 NPDES permits surveyed for this study. Of the 155 draft MOE parameters, 92 of the parameters were monitored by one or more of the facilities surveyed in this review. Seventy-two of these compounds are organic pollutants which are only monitored by facilities in Ohio and Illinois; these monitoring requirements have most likely been modified. Of the 92 chemicals monitored by one or more U.S. facilities, only 35 parameters identified in U.S. NPDES permits required monitoring more frequently than MOE requirements. Twenty of these parameters are organic chemicals that are required to be monitored by Illinois and Ohio facilities. However, Illinois and Ohio have most likely modified their monitoring requirements for halogenated and non-chlorinated volatiles, base-neutral, organochlorine pesticide and neutral-chlorinated extractables, and phenolics, thus reducing the 35 more stringent U.S. permit monitoring requirements to approximately 15 parameters. These 15 parameters are COD, cyanide, pH, ammonia, total suspended solids, chromium, copper, lead, nickel, silver, zinc, selenium, hexavalent chromium, chloroform, and oil and grease. The monitoring requirements for these 15 parameters are not expected to be modified, and will continue to be monitored more frequently than recommended by MOE.

On the basis of this comparison, it can be concluded that

1. MOE's monitoring programs are considerably more stringent than existing permits in each of the states reviewed in this study

2. 119 of the 155 draft MOE parameters are monitored at greater frequency than the most frequent permit requirement found in the 34 NPDES permits surveyed. (Note: if the parameter was not analyzed by any of the U.S. facilities surveyed, the MOE requirement for that parameter was considered more stringent.)

3. Expected modification of Ohio and Illinois permits may increase the number of more frequently monitored draft MOE parameters to 140 chemicals or parameters

4. The costs for proposed MOE monitoring program are inferred to be considerably higher than for the U.S. refineries reviewed. No actual calculation has been performed.

3. STORM AND COOLING WATER PERMITS

MOE draft effluent monitoring regulations recommend monitoring storm water and cooling water for the following list of contaminants: pH, TOC, total phosphorus, TSS, VSS, phenolics, sulfide, benzene, ethylbenzene, toluene, xylene, and oil and grease. For cooling water, samples are to be taken once per month and monitored for the above chemicals. In addition to this, a static 96-hour LC50 toxicity test on rainbow trout must be performed four times per year with cooling water discharges. For storm water discharges, samples are to be taken for each storm water discharge to surface water and analyzed for the above list of parameters, with the exception of chromium, zinc, and toxicity. However, analysis of ammonia plus ammonium is required as well.

Similar to this, petroleum refineries in states surrounding the Great Lakes are required to monitor a minimal amount of parameters in storm water and non-contact process cooling water (Tables 3-1 and 3-2). The only exception noted was for Standard Oil of Ohio, where annual, biannual, and quarterly analyses for polyaromatic hydrocarbons, purgeable halocarbons, volatile organics, and base-neutral extractables were required for one year. However, these monitoring requirements were modified at the conclusion of a one year data collection period (Morrison, personal communication).

During the NPDES application/renewal process, U.S. EPA requires that each applicant present quantitative information on:

- BOD, COD, TOC, TSS, ammonia-nitrogen, flow, temperature, and pH
- Metals, cyanide, and total phenols,
- Item V-B pollutants and dioxin, and
- Volatile organics.

This information is required for each outfall and includes non-contact process water (cooling water) and storm water. For all other pollutants listed on U.S. EPA's Form 2-C in the acid, base-neutral, and pesticide fractions, the applicant need only indicate if the pollutant is known or believed to be present and explain why it is in the discharge. If the pollutant is believed to be present at concentrations greater than 10 ppb, the pollutant must be quantitated.

As with process water monitoring requirements, U.S. EPA requires complete effluent characterization as a part of NPDES permit renewal (at least once every five years). These data are then used by the states to set permit limits and monitoring requirements. In this manner, monitoring requirements and effluent limits are assigned on a facility-specific basis, and pollutants not detected in the discharge during the NPDES permit renewal process are not typically monitored in the actual NPDES permit. In contrast, MOE's draft effluent monitoring requirements do not require a complete chemical characterization of storm water or cooling water discharges. Rather, MOE requires a periodic determination of a set of indicator parameters.

TABLE 3-1 STORMWATER MONITORING REQUIREMENTS

Parameter	Petroleum Refineries[a]																	
	21[b]	5	4[b]	6[b]	1[b]	3[b]	16	15	14	34	32	30	29[b]	28	23	22[b]	24[b]	10[b]
Flow		5/W	W	M		C	D	D			D		I	Q	D	I	I	D
BOD_5	W[c]	5/W	W			I												
TSS		5/W	W		I	I									M			D
Oil and Grease	W	5/W	W	W	I	I	W	2/W	M	W			I	Q	M	I	I	D
pH	W		W	M	I		W	2/W	M	W			I		M	I		
COD	W	5/W	W		I	I												D
TOC	W		W					2/W		W			I			I	I	
DO			W															D
Temperature				M														
Thermal Load																		
Phenol		5/W	M		I													D
Ammonia-N			W															D
Hexavalent Chromium		5/W			I													D
Total Chromium		5/W			I													D
Total Residual Cl																		
Iron														Q				
Sulfide																		D
Organics																		(d)

(a) For a list of refineries, see Table 1-1.
(b) Frequency of monitoring only pertinent when discharging.
(c) W = once per week; #/W = number (2 or 5) times per week; M = monthly; I = intermittent--monitor when discharging; Q = quarterly; D = daily; C = continuous.
(d) Ohio requires that noncontact cooling water and stormwater runoff be monitored for the pollutants identified Table A-4. After one year, if these pollutants are not observed in the discharge, the permit may be modified.

TABLE 3-2 COOLING WATER MONITORING REQUIREMENTS

Parameter	Petroleum Refineries[a] 15	21	33	32	31	30	28	26	25
Flow	D[b]	C	2/M	D	M	D	M	W	D
BOD_5			2/M						
TSS									
Oil and Grease		3/W	2/M		M	M			I
pH		3/W	2/M	D	M	M		W	W
COD									
TOC	2/W	5/W		2/W	M	M		W	I
DO									
Temperature	2/W	5/W		2/W			M	W	W
Phenol									
Ammonia-N									
Hexavalent Chromium									
Total Chromium									
Total Residual Chlorine		W							
Iron									
Sulfide									
Thermal Load				2/W					
Organics									

(a) For a list of refineries, see Table 1-1.

(b) D = daily; C = continous; W = once per week; #/W = number (2-5) per week; M = monthly; I = intermittent--when discharging.

4. SAMPLING REQUIREMENTS

Ontario's sampling protocols are discussed in the July 1987 draft of monitoring regulations (Section 13), and chemical-specific sampling protocols are summarized in Schedule 2 of that draft. For process waters, sampling locations for routine monitoring are generally after treatment and before any dilution with nonprocess water. With the exception of samples taken for sulphide, volatile organics, and solvent extractable analytical test groups, composite samples will be taken in proportion to the effluent flow. This may be done automatically using a sampling device which operates continuously and automatically adjusts sample size or sampling frequency to account for variable flow. Additionally, sampling may be performed manually by taking a minimum of eight samples over a 24-hour period and combining in proportion to flow. If the effluent flow is not variable, sampling is performed as above with the exception that sampling intervals do not exceed 15 minutes if sampling is automated. In contrast to this, all cooling water samples and process water samples taken for sulphide, volatile organics, and solvent extractables consist of three equal volume grab samples taken at intervals of at least 6 hours over a 24-hour period and combined in the laboratory prior to analysis. Storm water samples consists of a single grab sample.

The following general U.S. EPA guidance on effluent sampling is presented in 40 CFR 122.21(g)(7):

> Grab samples must be used for pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, and fecal coliform. For all other pollutants, 24-hour composite samples must be used. However, a minimum of one grab sample may be taken for effluents from holding ponds or other impoundments with a retention period greater than 24 hours, and a minimum of one to four (4) grab samples may be taken for storm water discharges depending on the duration of the discharge. One grab sample shall be taken in the first hour (or less) of discharge with one additional grab sample taken in each succeeding hour of discharge up to a minimum of four grab samples for discharges lasting four or more hours. In addition, the Director may waive composite sampling for any outfall for which the applicant demonstrates that the use of an automatic sampler is infeasible and that the minimum of

> four (4) grab samples will be a representative sample of the effluent being discharged.

Additionally, U.S. EPA defines grab and composite samples as:

> Grab sample: An individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.
>
> Composite sample: A combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24 hour period. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically. For GC/MS Volatile Organic Analysis (VOA), aliquots must be combined in the laboratory immediately before analysis. Four (4) (rather than eight) aliquots or grab samples should be collected for VOA. These four samples should be collected during actual hours of discharge over a 24 hour period and need not be flow proportioned. Only one analysis is required.

In comparison, MOE and U.S. EPA sampling requirements are similar. U.S. EPA does allow for a reduction in sampling if effluent retention time in holding ponds or other impoundments is greater than 24 hours. Additionally, U.S. EPA allows for a waiver of composite sampling provided the applicant can demonstrate that automatic sampling is infeasible and that four grab samples will be representative.

Reviews of actual permits indicate that in many cases, process water effluent monitoring sample locations are at the end of the pipe. However, there are some fairly common deviations from this general approach. Permits in several states require that "effluent monitoring for discharge 002 shall be taken at a point representative of discharge 002 but prior to mixing with discharge 001" (Illinois 4073). Other facilities require effluent "sample collection at monitoring stations just prior to discharge to the receiving water" (Wisconsin 3085-4). Temperature monitoring locations were often "at representative locations in the river," (or stated in similar language). In conclusion, the specific location of sample collection varied between permits, but in most cases did not allow for prior dilution.

In addition to the sampling requirements listed in Section 13 of the draft regulations, Schedule 2 of the draft effluent monitoring regulations specifies container types, acceptable pretreatment and preservation, and acceptable storage times. Although this schedule contains information similar to that found in Table II of 40 CRF Part 136 (as noted in 49 Fed. Regist. 43260), there are several specific differences found in the U.S. EPA regulations which are shown in Table 4-1.

TABLE 4-1 U.S. EPA SAMPLING REQUIREMENTS DIFFERENT FROM THOSE REQUIRED BY MOE SCHEDULE 2

Parameter	Preservation[a]		Maximum Holding Time	
	U.S. EPA	MOE	U.S. EPA	MOE
Cyanide	0.6 g ascorbic acid	Add NaOH to pH >12	14 days	7 days
pH			Analyze immediately	2 days
Ammonia/Total kjeldahl nitrogen			28 days	10 days
Organic carbon	HCl or H_2SO_4 to pH <2	H_2SO_4 to pH <2	28 days	5 days
Specific conductance			28 days	3 days
Total metals			6 months	30 days
Hexavalent chromium			24 hours	3 days
Mercury	H_2SO_4 to pH <2	1-2 ml HNO_3 per 250 ml; 0.5 ml $K_2Cr_2O_7$ to produce yellow color	28 days	7 days
Phenols			28 days	3 days
Halogenated volatiles			14 days	7 days
Non-halogenated volatiles	HCl to pH <2	80 mg/L Na_2SO_3 for samples with TRC	14 days	7 days
Water soluble volatiles	0.008% $Na_2SO_2O_3$ for samples with TRC; adjust pH to 4-5	80 mg/L Na_2SO_3 for samples with TRC	14 days	7 days
Base/neutral extractables	0.008% $Na_2S_2O_3$ for samples with TRC; store in dark	None	7 days until extraction; 40 days after extraction	30 days
Acid extractables	0.008% $Na_2S_2O_3$ for samples with TRC	None	7 days until extraction; 40 days after extraction	30 days
Neutral chlorinated			7 days until extraction; 40 days after extraction	30 days
Dioxins	0.008% $Na_2S_2O_3$	None	7 days until extraction; 40 days after extraction	30 days
Solvent extractables	H_2SO_4 to pH <2	None	28 days	7 days
PCBs			7 days until extraction; 40 days after extraction	30 days

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(a) Preservatives are generally added immediately after sampling and sample is stored at 4 C until ready for analysis.

5. ANALYTICAL METHODS

Table 5-1 compares the methods approved by MOE to the methods approved by the U.S. EPA. Included under the U.S. EPA category is the closest analogous method, a short method description, and an approximate detection limit (when applicable). Also included in Table 5-1 are any comments on the comparison of the methods.

The majority of the MOE recommended techniques are very similar to those of U.S. EPA. In addition, MOE has noted alternative analysis techniques, whereas U.S. EPA generally does not offer any alternative techniques. There are, however, some notable differences between the method(s) proposed by MOE and those proposed by U.S. EPA. Several of these differences are enumerated below.

1. Dissolved organic carbon (DOC).
   MOE suggests that the sample be stripped of all inorganic carbon, then carried through a UV digestion and colorimetric determination of DOC. U.S. EPA recommends removal of the suspended matter, followed by catalytic combustion to convert all organic carbon to CO_2. The CO_2 is then measured by IR detector.

2. Antimony.
   MOE suggests an acid digestion followed by hydride generation atomic absorption. U.S. EPA recommends an acid digestion followed by either direct aspiration or furnace atomic absorption.

3. Total alkyl lead.
   MOE suggests two methods: (1) a liquid/liquid extraction followed by colorimetry or (2) sample derivatization followed by GC/AA determination of total alkyl lead. Neither U.S. EPA nor the American Public Health Association (APHA) have an approved method for this parameter.

4. Fluorine (Fluoride). [Note: It is assumed that the analyte of interest here is fluoride (salt) rather than fluorine (gas)].

   MOE suggests neutron activation analysis or ion chromatography for this parameter, estimating a detection limit of 1 mg/L. U.S. EPA's recommendation for ion-specific electrode (potentiometric analysis), estimating a detection limit of 0.1 mg/L, is significantly lower than that of the MOE.

5. Chlorine.

   Again, MOE suggests neutron activation analysis or ion chromatography for this analyte, estimating a detection limit of 1 mg/L. U.S. EPA recommends a titration technique for free residual chlorine (approximate detection limit of 0.1 mg/L), and an automated colorimetric technique for chloride (approximate detection limit of 1 mg/L). MOE's recommendations are significantly different from those of U.S. EPA.

6. Bromine (Bromide). [Note: It is assumed that the analyte of interest here is bromide (salt) rather than bromine (gas)].

   MOE suggests neutron activation analysis or ion chromatography for this parameter, with a detection limit of 1 mg/L. U.S. EPA recommends a titrimetric technique, with an approximate detection limit of 2 mg/L. The two methods are very different from one another.

7. Iodine (Iodide).

   MOE suggests neutron activation analysis or ion chromatography for this parameter, estimating a detection limit of 1 mg/L. For iodide, U.S. EPA recommends a titrimetric technique, with a detection limit of approximately 2 mg/L. Iodine can be determined amperometrically, but this technique has not yet been documented by U.S. EPA.

8. Fatty and Resin Acids.
   MOE suggests a liquid/liquid extraction, followed by GC/FID detection for this parameter. Neither U.S. EPA nor APHA have a documented method specifically for this parameter. The U.S. Food and Drug Administration (FDA) may, however, have regulations concerning the analysis of fatty acids in foods.

This is only a brief overview of the analytical procedures that are recommended. Procedures may vary slightly between MOE and U.S. EPA, but for those methods which are considered similar, the scheme of methods for a given analyte is essentially the same.

TABLE 5-1 COMPARISON OF ONTARIO MINISTRY OF THE ENVIRONMENT AND U.S. EPA ANALYTICAL METHODS

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Chemical Oxygen Demand (COD)	Chemical Oxygen Demand (COD)	Methods are essentially identical.
a. Reflux (samples with solids) and determine COD with back titration.	a. (U.S. EPA Method 410.1) Reflux and determine COD with back titration. Detection limit = 5 mg/L	
b. Oven digestion at 150 C in presence of redox reagents; determine COD by colorimetric measurement of Cr III. Detection limit = 10 mg/L	b. (U.S. EPA Method 410.4) Oven digestion at 150 C in presence of redox reagents; determine COD by colormetric measurement of Cr III. Detection limit = 20 mg/L for manual operation and 3 mg/L for automated operation.	
Cyanide	Cyanide (U.S. EPA Method 335.3)	Methods are essentially identical.
a. Acid distillation preparation followed by colorimetry or titration. Detection limit = 0.005 mg/L	a. (Total) Reflux-distillation operation using a mineral acid in the presence of magnesium ion. Detection by colorimetry or titration. Detection limit = 0.02 mg/L	
Hydrogen ion (pH)	Hydrogen ion (pH)	Methods identical.
a. pH electrode and meter.	a. (U.S. EPA Method 150.1) pH meter and electrode.	

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* Denotes methods which appeared on previous draft regulations, but do not appear on current draft regulations.

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Nitrogen (Ammonia plus Ammonium) a. Distillation (unless proven unnecessary) followed by colorimetry, specific ion electrode or titration. Detection limit = 0.25 mg/L as N	Nitrogen (ammonia) a. (U.S. EPA Method 350.1) Alkaline phenol and hypochlorite react with ammonia to form indophenol blue; this blue is proportional to the ammonia concentration (colorimetric determination) Detection limit = 0.01 mg/L as N	Distillation is also recommended by EPA.
Nitrogen (Nitrate) a. Colorimetry, including step for reduction of NO_3 to NO_2; alternatives include Automated Technicon or ion chromatography. Detection limit = 0.25 mg/L as N	Nitrate & Nitrite Nitrogen a. (U.S. EPA Method 353.2) Automated Technicon which includes cadmium reduction of all NO_3 to NO_2. Detection limit = 0.1 mg/L NO_3-N	Ion chromatography is permitted by EPA for special applications (i.e. acid deposition studies).
Nitrogen (Nitrite) a. colorimetry b. titration c. Automated Technicon d. ion chromatography Detection limit = 0.025 mg/L as N	Nitrite - Nitrogen a. (U.S. EPA Method 353.2) Spectrophotometric detection of nitrite in water (Automated Technicon). Detection limit = 0.01-1.0 mg/L NO_2-N	Titration and ion chromatography not suggested by EPA.

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Nitrogen (Total Kjeldahl nitrogen) a. Standard Kjeldahl digestion procedure unless proven unnecessary followed by colorimetric determination of nitrogen. Detection limit = 0.5 mg/L as N	Total Kjeldahl Nitrogen a. (U.S. EPA Method 351.2) Standard Kjeldahl digestion procedure followed by the automated colorimetric determination of nitrogen (Autoanalyzer II). Detection limit = 0.05 mg/L	Methods essentially identical.
Organic Carbon (DOC) a. Strip inorganic carbon b. Automated UV digestion followed by colorimetric determination of DOC. Detection limit = 0.5 mg/L as C	Organic Carbon (DOC) a. (U.S. EPA Method 415.1) Remove suspensed matter by filtering through glass fiber filter. b. Convert organic carbon to CO_2 by catalytic combustion. c. Determine CO_2 by IR detector Detection limit = 1 mg/L	
Total Phosphorus a. Perchloric acid digestion unless proven unnecessary, followed by colorimetric determination of P. Detection limit = 0.1 as P	Total Phosphorus a. (U.S. EPA Method 365.4) Sample digested with H_2SO_4, K_2SO_4 and $HgSO_4$; this is followed by the automated colorimetric determination of P using an ascorbic acid reagent. Detection limit = 0.05 mg/L	Reagents used in digestion are different. Colorimetric determinations (techniques) may or may not be similar.
Specific conductance a. Conductivity meter and cell.	Specific conductance a. (U.S. EPA Method 120.1) Wheatstone Bridge	Methods essentially the same.

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Total suspended solids a. Gravimetric determination. Detection limit = 2 mg/L	Total Filterable Residue a. (U.S. EPA Method 160.1) Gravimetric determination. Detection limit = 10 mg/L	Nomenclature slightly different, but methods assumed to be similar (as long as analyte is similar).
Arsenic, Antimony, Selenium a. Acid digestion followed by hydride generation atomic absorption. Detection limit = 0.005 mg/L	Antimony (EPA Method #) a. Direct Aspiration (204.1) b. Furnace (204.2)	EPA does not recommend hydride generation technique for antimony, but does recommend the technique for selenium and arsenic analysis.
	Arsenic (APHA Method 303E) a. Acid Digestion followed by hydride generation atomic absorption.	
	Selenium (U.S. EPA Method 270.3) a. Acid digestion followed by hydride generation atomic absorption.	
Tetra-alkyl, Tri-alkyl or Total alkly lead a. Liquid/liquid extraction followed by colorimetry or atomic absorption. b. Alternatively, sample is derivitized and total alkyl lead is determined by GC/AA. Detection limit 0.002 mg/L	No approved EPA or APHA method for this parameter.	

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Halogenated Volatiles a. Purge and trap, followed by GC/MS analysis.	Halogenated Volatiles a. U.S. EPA Method 624 (Purgeables) Purge and Trap followed by GC/MS analysis. b. U.S. EPA Method 601 (Purgeable Halocarbons) Purge and Trap followed by GC/ECD.	Methods essentially identical. MOE offers purge and trap with GC/ECD as an alternative method. EPA offers GC/ECD (Method 601) as an alternative.
Non-chlorinated Volatiles a. Purge and trap followed by GC/MS analysis.	Non-chlorinated voaltiles a. (U.S. EPA Methods 624 and and 602) Purge and trap followed by GC/MS (624). Purge and trap followed by GC/PID (602).	Methods essentially the same. MOE offers purge and trap with GC/ECO and/or GC/FID (single capillary) detection as alternative method. EPA does not note this as an alternative method.
Water Soluble Volatiles a. Acrolein Acrylonitrile Purge and trap followed by GC/MS analysis.	Water soluble volatiles a. (U.S. EPA Method 603) Purge and trap followed by GC/MS.	Methods similar.
Base Neutral Extractables a. liquid/liquid extraction followed by GC/MS analysis.	Base/Neutral Extractions a. (U.S. EPA Method 625) Liquid/liquid extraction followed by GC/MS analysis.	Methods essentially identical. MOE offers liquid/liquid extraction followed by HPLC/UV or fluorescence analysis for PAH's only, as alternate method. EPA also offers this as an alternative (U.S. EPA Method 610).

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Acid Extractable Organics (phenolics) a. Liquid/liquid extraction followed by GC/MS analysis.	Acid Extractable Organic Compounds a. (U.S. EPA Method 625) Liquid/liquid extraction followed by GC/MS analysis.	Methods essentially identical.
Fluorine* a. Neutron Activation Analysis or ion chromatography.	Fluoride a. (U.S. EPA Method 340.2) Fluoride is determined potentiometrically using a fluoride electrode.	U.S. EPA method very different from neutron activation analysis, and from ion chromatography.
Chlorine* a. Neutron activation analysis or ion chromatography.	Chlorine Residual a. (U.S. EPA Method 330.1) Chlorine and chloramines stoichiometrically liberate iodine from potassium iodide at pH <4. The iodine is titrated with standard reducing agent using amperometer to determine end point. b. Chloride (U.S. EPA Method 325.2) (Colorimetric, Automated Ferricyanide AA II).	
Bromine* a. Neutron activation analysis or ion chromatography.	Bromide a. (U.S. EPA Method 320.1) Titrimetric technique. Divide sample into 2 aliquots. One aliquot is analyzed for iodide as described below. Other aliquot is analyzed for iodide plus bromide by converting these halides to	

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
	iodate and bromide. Treat iodometrically. Bromide is calculated by difference.	
Iodine* a. Neutron activation analysis or ion chromatography.	Iodide a. (U.S. EPA Method 345.1) After pretreatment to remove interferences, the sample is analyzed for iodide by converting the iodide to iodate with bromine water and titrating with phenylarsine oxide or sodium thiosulfate.	
Phenoxy Acid Herbicides* (Extractable) . Dichloromethane (lquid/liquid extraction) . pH adjustment < 2 . Derivitization . Cleanup . GC/ECD - (Dual capilliary) detection	Phenoxy Acid Herbicides (APHA Method 509B) . Ethyl either liquid/liquid extraction . Neutral pH . Cleanup . GC/ECD detection (dual column	Techniques similar Use of different extraction solvents. Dual column indicates that two columns are used in the analysis; if positive analysis by first column, then result is confirmed by positive result on a second column.
Organochlorine Pesticides* . Dichloromethane liquid/liquid extraction . Neutral pH . Cleanup . GC/ECD (dual capillary) detection	Halogenated Hydrocarbon Pesticides (U.S. EPA Method 608) . Dichloromethane liqiud/liquid extraction . Neutral pH . Cleanup . GC/ECD detection (dual column)	Extraction techniques similar. Detection techniques similar.

TABLE 5-1 (Cont.)

MOE Method Classification and Description	Analogous U.S. EPA Method Classification and Description	Comments
Neutral-chlorinated Extractables (i.e. PCBs) . Dichloromethane liquid/liquid extraction . Neutral pH . Cleanup . GC/ECD (Dual capilliary) detection	Polychlorinated Biphenyls (U.S. EPA Method 608) . Dichloromethane liquid/liquid extraction . Neutral pH . Cleanup . GC/ECD detection	Extraction techniques similar.
Chlorinated dibenzo-p-dioxins and dibenzofurans . Liquid/liquid extraction . Cleanup . GC/MS detection	U.S. EPA Method 613 for 2,3,7,8-TCDD . Liquid/liquid extraction . Cleanup . GC/MS	Techniques essentially identical.
Solvent Extractable Oil and Grease . Acidify with a mineral acid to pH < 2 . Dichloromethane liquid/liquid extraction . Gravimetric determination	Total Recoverable Oil and Grease (U.S. EPA Method 413.2) . Acidify to pH < 2 . Fluorocarbon-113 liquid/liquid extraction . Gravimetric determination	Techniques essentially identical. Extraction solvents different.

TABLE 5-1 (Cont.)

Metal	Direct Aspiration	Furnace	ICP
Aluminum	0.1 mg/L (202.1)	0.0001 mg/L (202.2)	(200.7)
Beryllium	0.005 mg/L (210.1)	0.0002 mg/L (210.2)	(200.7)
Cadmium	0.005 mg/L (213.1)	0.0001 mg/L (213.2)	(200.7)
Chromium (Total)	0.05 mg/L (218.1)	0.001 mg/L (218.2)	(200.7)
Cobalt	0.05 mg/L (219.1)	0.001 mg/L (219.2)	(200.7)
Copper	0.02 mg/L (220.1)	0.001 mg/L (220.2)	(200.7)
Lead	0.10 mg/L (239.1)	0.001 mg/L (239.2)	(200.7)
Molybdenum	0.1 mg/l (246.1)	0.001 mg/l (246.2)	(200.7)
Nickel	0.04 mg.L (249.1)	0.001 mg/L (249.2)	(200.7)
Silver	0.01 mg/L (272.1)	0.0002 mg/L (272.2)	(200.7)
Thallium	0.1 mg/L (279.1)	0.001 mg/L (279.2)	(200.7)
Vanadium	0.2 mg/L (286.1)	0.004 mg/L (286.2)	(200.7)
Zinc	0.005 mg/L (289.1)	0.0005 mg/L (289.2)	(200.7)

Note: All EPA techniques require acid digestion prior to analysis.

EPA Method Number in ( ).

6. TOXICITY TEST REQUIREMENTS

MOE's conceptual draft dated July 1987 provides guidance for evaluating the acute toxicity of petroleum refinery effluents. Proposed requirements include the following end-of-pipe testing to yield 96-hour LC50 values:

- Monthly static acute toxicity testing on each outfall using rainbow trout (Salmo gairdneri)
- Quarterly static acute testing using rainbow trout for each cooling water outfall

After 1 year of acute toxicity testing, monitoring frequency could be reduced.

In comparison, a review of the refinery permits surveyed in this study indicated that none of the 34 permits had specific toxicity test requirements. The only mention of effluent toxicity testing was for several refineries in Pennsylvania in which site-specific water quality-based permit limits for the protection of aquatic life can be developed following a demonstration that the revised limits result in "safe concentration values for the pollutants in question" [Gulf Oil Corporation, Permit No. PA 0011533, Part C(e)].

The lack of effluent toxicity testing requirements in these permits may change when they are renewed as a result of U.S. EPA's national policy statement dated 9 March 1985. U.S. EPA's national policy for the "Development of Water Quality-Based Permit Limitations for Toxic Pollutants" recommend "the use of biological techniques as a complement to chemical-specific analyses to assess effluent discharges and express permit limitations" (49 Fed. Regist. 9017). Detailed technical guidance for this policy is provided in EPA's (1985) report titled "Technical Support Document for Water Quality-Based Toxics Control," and the information presented in that document is currently being applied to many regional and state water regulations.

7. PROGRESSIVE STATES--PERMIT REQUIREMENTS

An attempt was made to identify states outside of the Great Lakes Region that may have more stringent regulations for petroleum industry effluents. Representatives from U.S. EPA Regions IV and VI were contacted for information regarding general permit requirements within the regions and specific states which have developed more restrictive permits.

Region IV (Florida, Georgia, Alabama, Mississippi, Tennesse, Kentucky, South Carolina, and North Carolina) is generally regarded as one of the more progressive regions by U.S. EPA regarding biomonitoring and permit requirements. However, the petroleum industry operates minimally in Region IV, and communication with Region IV personnel indicated that no specific regulations have been developed for this industry. Therefore, no state regulatory agencies within Region IV were contacted.

The petroleum industry has several facilities in Region VI (Arkansas, Louisiana, Oklahoma, Texas, and New Mexico). However, permits are established on a site-specific basis, and in general, the monitoring requirements for petroleum facilities are no more stringent than those for other industrial categories. The region has implemented a biomonitoring requirement to screen for toxicity in all effluents. A screening test, consisting of a 48-hour static acute test, is performed on the effluent to detect the presence of toxicity. If toxicity is detected, a definitive 96-hour static acute test is performed periodically to assess effluent toxicity. A representative of the Texas Water Resources Commission was contacted to ascertain specific state requirements within Region VI. Permit requirements within the state conform to the guidance presented in 40 CFR 419, which modifies best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and best practicable control technology (BPT) for petroleum refinery effluent limitations.

Most of the petroleum refineries in Texas are located on the coast and discharge into the Gulf of Mexico where extensive dilution is available. Only one refinery has more stringent monitoring requirements than described in the Code of Federal Regulations. This refinery is Diamond Shamrock located near Corpus Christi, which monitors chlorides in its effluent in response to drinking water standards.

In addition to these regions, the state of California was contacted regarding discharge limits applicable to the petroleum industry. California is divided into nine regional water boards which all have individual authority to develop monitoring requirements. The San Francisco regional office was contacted because the recently finalized San Francisco Basin plan is known to be extremely stringent. Also there are several large refineries within this area (e.g., Shell and Chevron). Information obtained from a representative of this office indicated that all permit requirements are site-specific and depend on water quality objectives and basin plan objectives for the region. Therefore, aside from general EPA recommendations, no general guidelines are available.

Although this investigation for states with progressive effluent monitoring requirements for the petroleum industry was limited, information obtained indicates that site-specific requirements are generally developed, and a review of these permits would be necessary to fully evaluate the nature of the requirements. The permits pertinent to the refineries in the Great Lakes states are probably as representative as any other in the United States. From this analysis, it appears that Ohio has established one of the more stringent sets of monitoring requirements for the petroleum refining industry.

8. CONCLUSIONS

A total of 34 petroleum refinery NPDES permits from states surrounding the Great Lakes were reviewed. Monitoring requirements contained in the permits, as well as U.S. EPA National Pollution Discharge Elimination System (NPDES) application requirements, were compared to MOE draft regulations, and the following general conclusions were drawn:

- MOE requires an effluent chemical characterization once every three years whereas U.S. EPA requires effluent characterization once every 5 years as a part of NPDES permit renewal.

- U.S. EPA requires quantitative data on 75 chemical or physical parameters, in contrast to quantitative data on 155 chemical or physical parameters required by MOE.

- Most states focus on monitoring conventional and non-conventional pollutants (e.g., pH, TSS, BOD, etc.) as opposed to organic priority pollutants.

- Only 92 of the 155 parameters required to be monitored by MOE are monitored by at least one of the facilities surveyed. Of these 92 compounds, 36 are monitored at a frequency greater than or equal to those established by MOE; therefore, 119 of the 155 compounds identified by MOE are monitored more frequently than the most stringent U.S. permit limit identified in the survey.

- The most stringent states, Ohio and Illinois, required monitoring by one or more facilities for 84 and 83 of the 155 compounds required to be monitored in the draft regulations, respectively. Furthermore, Ohio requires one or more facilities to monitor for an additional 16 chemicals to bring the most stringent total to 100 chemicals, and

Illinois requires one or more facilities to monitor for an additional 24 chemicals which amounts to a total of 107 compounds.

- Non-process (cooling) water and storm water monitoring requirements for petroleum refineries in the U.S. are similar to the requirements recommended by MOE.

- No toxicity limits are currently being employed in the petroleum refinery NPDES permits reviewed. In contrast, MOE requires monthly biomonitoring of each process outfall and quarterly monitoring of each cooling water outfall.

- With certain exceptions, EPA/MOE analytical protocols and detection limits for the same constituent are not significantly different

- Of the states surveyed, Ohio appears to have the most stringent monitoring requirements, and Ohio requirements are less stringent than those proposed by MOE.

Additional detail regarding these conclusions are presented in the text of this report.

APPENDIX A

APPENDIX A

NPDES Application Form 2-C

A-1 Comparison of Ontario, U.S. EPA, and Wisconsin Monitoring Requirements

A-2 Comparison of Ontario, U.S. EPA, and Minnesota Monitoring Requirements

A-3 Comparison of Ontario, U.S. EPA, and Michigan Monitoring Requirements

A-4 Comparison of Ontario, U.S. EPA, and Ohio Monitoring Requirements

A-5 Comparison of Ontario, U.S. EPA, and Illinois Monitoring Requirements

A-6 Comparison of Ontario, U.S. EPA, and Indiana Monitoring Requirements

A-7 Comparison of Ontario, U.S. EPA, and Pennsylvania Monitoring Requirements

A-8 Comparison of Ontario, U.S. EPA, and Great Lakes Drainage Basin Monitoring Requirements

A-9 Comparison of Ontario, U.S. EPA, and Most Stringent Monitoring Requirements

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INSTRUCTIONS — FORM 2c

Application for Permit to Discharge Wastewater

EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL OPERATIONS

This form must be completed by all applicants who check "yes" to item II-C in Form 1.

Public Availability of Submitted Information.

Your application will not be considered complete unless you answer every question on this form and on Form I. If an item does not apply to you, enter "NA" *(for not applicable)* to show that you considered the question.

You may not claim as confidential any information required by this form or Form I, whether the information is reported on the forms or in an attachment. This information will be made available to the public upon request.

Any information you submit to EPA which goes beyond that required by this form or Form I you may claim as confidential, but claims for information which is effluent data will be denied. If you do not assert a claim of confidentiality at the time of submitting the information, EPA may make the information public without further notice to you. Claims of confidentiality will be handled in accordance with EPA's business confidentiality regulations at 40 CFR Part 2.

Definitions

All significant terms used in these instructions and in the form are defined in the glossary found in the General Instructions which accompany Form 1.

EPA ID Number

Fill in your EPA Identification Number at the top of each page of Form 2c. You may copy this number directly from item I of Form I.

Item I

You may use the map you provided for item XI of Form I to determine the latitude and longitude of each of your outfalls and the name of the receiving water.

Item II-A

The line drawing should show generally the route taken by water in your facility from intake to discharge. Show all operations contributing wastewater, including process and production areas, sanitary flows, cooling water, and stormwater runoff. You may group similar operations into a single unit, labeled to correspond to the more detailed listing in item II-B. The water balance should show average flows. Show all significant losses of water to products, atmosphere, and discharge. You should use actual measurements whenever available; otherwise use your best estimate. An example of an acceptable line drawing appears in Figure 2c-I to these instructions.

Item II-B

List all sources of wastewater to each outfall. Operations may be described in general terms *(for example, "dye-making reactor" or "distillation tower")*. You may estimate the flow contributed by each source if no data are available. For stormwater discharges you may estimate the average flow, but you must indicate the rainfall event upon which the estimate is based and the method of estimation. For each treatment unit, indicate its size, flow rate, and retention time, and describe the ultimate disposal of any solid or liquid wastes not discharged. Treatment units should be listed in order and you should select the proper code from Table 2c-1 to fill in column 3-b for each treatment unit. Insert "XX" into column 3-b if no code corresponds to a treatment unit you list. If you are applying for a permit for a privately owned treatment works, you must also identify all of your contributors in an attached listing.

Item II-C

A discharge is intermittent unless it occurs without interruption during the operating hours of the facility, except for infrequent shutdowns for maintenance, process changes, or other similar activities. A discharge is seasonal if it occurs only during certain parts of the year. Fill in every applicable column in this item for each source of intermittent or seasonal discharges. Base your answers on actual data whenever available; otherwise, provide your best estimate. Report the highest daily value for flow rate and total volume in the "Maximum Daily" columns *(columns 4-1-2 and 4-b-2)*. Report the average of all daily values measured during days when discharge occurred within the last year in the "Long Term Average" columns *(columns 4-a-l and 4-b-l)*.

Item III-A

All effluent guidelines promulgated by EPA appear in the Federal Register and are published annually in 40 CFR Subchapter N. A guideline applies to you if you have any operations contributing process wastewater in any subcategory covered by a BPT, BCT, or BAT guideline. If you are unsure whether you are covered by a promulgated effluent guideline, check with your EPA Regional office *(Table 1 in the Form 1 instructions)*. You must check "yes" if an applicable effluent guideline has been promulgated, even if the guideline limitations are being contested in court. If you believe that a promulgated effluent guideline has been remanded for reconsideration by a court and does not apply to your operations, you may check "no."

Item III-B

An effluent guideline is expressed in terms of production *(or other measure of operation)* if the limitation is expressed as mass of pollutant per operational parameter; for example, "pounds of BOD per cubic foot of logs from which bark is removed," or "pounds of TSS per megawatt hour of electrical energy consumed by smelting furnace". An example of a guideline not expressed in terms of a measure of operation is one which limits the concentration of pollutants.

Item III-C

This item must be completed only if you checked "yes" to item III-B. The production information requested here is necessary to apply effluent guidelines to your facility and you cannot claim it as confidential. Report quantities in the units of measurement used in the applicable effluent guideline. The production figures provided must be based on actual daily production and not on design capacity or on predictions of future operations. To obtain alternate limits under 40 CFR 122.45(b)(2)(ii), you must define your maximum production capability and demonstrate to the Director that your actual production is substantially below maximum production capability and that there is a reasonable potential for an increase above actual production during the duration of the permit.

Item IV-A

If you check "yes" to this question, complete all parts of the chart, or attach a copy of any previous submission you have made to EPA containing same information.

Item IV-B

You are not required to submit a description of future pollution control projects if you do not wish to or if none is planned.

Item V-A, B, C, and D

The items require you to collect and report data on the pollutants discharged for each of your outfalls. Each part of this item addresses a different set of pollutants and must be completed in accordance with the specific instructions for that part. The following general instructions apply to the entire item.

General Instructions

Part A requires you to report at least one analysis for each pollutant listed. Parts B and C require you to report analytical data in two ways. For some pollutants, you may be required to mark 'X' in the "Testing Required" column *(column 2-a, Part C)*, and test *(sample and analyze)* and report the levels of the pollutants in your discharge whether or not you expect them to be present in your discharge. For all others, you must mark 'X' in either the "Believe Present" column or the "Believe Absent" column *(columns 2-a or 2-b, Part B, and columns 2-b or 2-c, Part C)* based on your best estimate, and test for those which you believe to be present. *(See specific instructions on the form and below for Parts A through D.)* Base your determination that a pollutant is present in or absent from your discharge on your knowledge of your raw materials, maintenance chemicals, inter-

FORM 2C — INSTRUCTIONS *(continued)*

ITEM V — A, B, C, and D *(continued)*

mediate and final products and byproducts, and any previous analyses known to you of your effluent or similar effluent. *(For example, if you manufacture pesticides, you should expect those pesticides to be present in contaminated stormwater runoff.)* If you would expect a pollutant to be present solely as a result of its presence in your intake water, you must mark "Believe Present" but you are not required to analyze for that pollutant. Instead, mark an "X" in the "Intake" column.

A. Reporting. All levels must be reported as concentration and as total mass. You may report some or all of the required data by attaching separate sheets of paper instead of filling out pages V-I to V-9 if the separate sheets contain all the required information in a format which is consistent with pages V-I to V-9 in spacing and in identification of pollutants and columns. *(For example, the data system used in your GC/MS analysis may be able to print data in the proper format.)* Use the following abbreviations in the columns headed "Units" *(column 3, Part A, and column 4, Parts B and C)*.

Concentration	
ppm	parts per million
mg/l	milligrams per liter
ppb	parts per billion
ug/l	micrograms per liter

Mass	
lbs	pounds
ton	tons *(English tons)*
mg	milligrams
g	grams
kg	kilograms
T	tonnes *(metric tons)*

All reporting of values for metals must be in terms of "total recoverable metal," unless:

(1) An applicable, promulgated effluent limitation or standard specifies the limitation for the metal in dissolved, valent, or total form; or

(2) All approved analytical methods for the metal inherently measure only its dissolved form (e.g., hexavalent chromium); or

(3) The permitting authority has determined that in establishing case-by-case limitations it is necessary to express the limitations on the metal in dissolved, valent, or total form to carry out the provisions of the CWA.

If you measure only one daily value, complete only the "Maximum Daily Values" columns and insert "1" into the "Number of Analyses" column *(columns 2-a and 2-d, Part A, and column 3-a, 3-d, Parts B and C)*. The permitting authority may require you to conduct additional analyses to further characterize your discharges. For composite samples, the daily value is the total mass or average concentration found in a composite sample taken over the operating hours of the facility during a 24-hour period; for grab samples, the daily value is the arithmetic or flow-weighted total mass or average concentration found in a series of at least four grab samples taken over the operating hours of the facility during a 24-hour period.

If you measure more than one daily value for a pollutant and those values are representative of your wastestream, you must report them. You must describe your method of testing and data analysis. You also must determine the average of all values within the last year and report the concentration and mass under the "Long Term Average Values" columns *(column 2-c, Part A, and column 3-c, Parts B and C)*, and the total number of daily values under the "Number of Analyses" columns *(column 2-d, Part A, and columns 3-d, Parts B and C)*. Also, determine the average of all daily values taken during each calendar month, and report the highest average under the "Maximum 30-day Values" columns *(column 2-c, Part A, and column 3-b, Parts B and C)*.

B. Sampling: The collection of the samples for the reported analyses should be supervised by a person experienced in performing sampling of industrial wastewater. You may contact your EPA or State permitting authority for detailed guidance on sampling techniques and for answers to specific questions. Any specific requirements contained in the applicable analytical methods should be followed for sample containers, sample preservation, holding times, the collection of duplicate samples, etc. The time when you sample should be representative of your normal operation, to the extent feasible, with all processes which contribute wastewater in normal operation, and with your treatment system operating properly with no system upsets. Samples should be collected from the center of the flow channel, where turbulence is at a maximum, at a site specified in your present permit, or at any site adequate for the collection of a representative sample.

For pH, temperature, cyanide, total phenols, residual chlorine, oil and grease, and fecal coliform, grab samples must be used. For all other pollutants 24-hour composite samples must be used. However, a minimum of one grab sample may be taken for effluents from holding ponds or other impoundments with a retention period of greater than 24 hours. For stormwater discharges a minimum of one to four grab samples may be taken, depending on the duration of the discharge. One grab must be taken in the first hour *(or less)* of discharge, with one additional grab *(up to a minimum of four)* taken in each succeeding hour of discharge for discharges lasting four or more hours. The Director may waive composite sampling for any outfall for which you demonstrate that use of an automatic sampler is infeasible and that a minimum of four grab samples will be representative of your discharge.

Grab and composite samples are defined as follows:

Grab sample: An individual sample of at least 100 milliliters collected at a randomly-selected time over a period not exceeding 15 minutes.

Composite sample: A combination of at least 8 sample aliquots of at least 100 milliliters, collected at periodic intervals during the operating hours of a facility over a 24 hour period. The composite must be flow proportional; either the time interval between each aliquot or the volume of each aliquot must be proportional to either the stream flow at the time of sampling or the total stream flow since the collection of the previous aliquot. Aliquots may be collected manually or automatically. For GC/MS Volatile Organic Analysis (VOA), aliquots must be combined in the laboratory immediately before analysis. Four (4) *(rather than eight)* aliquots or grab samples should be collected for VOA. These four samples should be collected during actual hours of discharge over a 24 hour period and need not be flow proportioned. Only one analysis is required.

The Agency is currently reviewing sampling requirements in light of recent research on testing methods. Upon completion of its review, the Agency plans to propose changes to the sampling requirements.

Data from samples taken in the past may be used, provided that:

All data requirements are met;

Sampling was done no more than three years before submission; and

All data are representative of the present discharge.

Among the factors which would cause the data to be unrepresentative are significant changes in production level, changes in raw materials, processes, or final products, and changes in wastewater treatment. When the Agency promulgates new analytical methods in 40 CFR Part 136, EPA will provide information as to when you should use the new methods to generate data on your discharges. Of course, the Director may request additional information, including current quantitative data, if she or he determines it to be necessary to assess your discharges.

C. Analysis: You must use test methods promulgated in 40 CFR Part 136; however, if none has been promulgated for a particular pollutant, you may use any suitable method for measuring the level of the pollutant in your discharge provided that you submit a description of the method or a reference to a published method. Your description should include the sample holding time, preservation techniques, and the quality control measures which you used. If you have two or more substantially identical outfalls, you may request permission from your permitting authority to sample and analyse only one outfall and submit the results of the analysis

FORM 2C — INSTRUCTIONS *(continued)*

ITEM V — A, B, C, and D *(continued)*

for other substantially identical outfalls. If your request is granted by the permitting authority, on a separate sheet attached to the application form, identify which outfall you did test, and describe why the outfalls which you did not test are substantially identical to the outfall which you did test.

D. Reporting of Intake Data: You are not required to report data under the "Intake" columns unless you wish to demonstate your eligibility for a "net" effluent limitation for one or more pollutants, that is, an effluent limitation adjusted by subtracting the average level of the pollutant(s) present in your intake water. NPDES regulations allow net limitations only in certain circumstances. To demonstrate your eligibility, under the "Intake" columns report the average of the results of analyses on your intake water *(if your water is treated before use, test the water after it is treated)*, and discuss the requirements for a net limitation with your permitting authority.

Part V-A

Part V-A must be completed by all applicants for all outfalls, including outfalls containing only noncontact cooling water or storm runoff. However, at your request, the Director may waive the requirement to test for one or more of these pollutants, upon a determination that available information is adequate to support issuance of the permit with less stringent reporting requirements for these pollutants. You also may request a waiver for one or more of these pollutants for your category or subcategory from the Director, Office of Water Enforcement and Permits. See discussion in General Instructions to item V for definitions of the columns in Part A. The "Long Term Average Values" column *(column 2-c)* and "Maximum 30-day Values" column *(column 2-b)* are not compulsory but should be filled out if data are available.

Part V-B

Part V-B must be completed by all applicants for all outfalls, including outfalls containing only noncontact cooling water or storm runoff. You must report quantitative data if the pollutant(s) in question is limited in an effluent limitations guideline either directly, or indirectly but expressly through limitation on an indicator *(e.g., use of TSS as an indicator to control the discharge of iron and aluminum)*. For other discharged pollutants you must provide quantitative data or explain their presence in your discharge. Upon request the Director, Office of Water Enforcement and Permits, may waive the requirement to test for pollutantsfor an industrial category or subcategory. Your request must be supported by data representative of the industrial category or subcategory in question. The data must demonstrate that individual testing for each applicant is unnecessary, because the facilities in the category or subcategory discharge substantially identical levels of the pollutant or discharge the pollutant uniformly at sufficiently low levels.The "Long Term Average Values" column *(column 3-c)* and "Maximum 30-day Values" column *(column 30b)* are not compulsory but should be filled out if data are available.

Part V-C

Table 2c-2 lists the 34 "primary" industry categories in the left-hand column. For each outfall, if any of your processes which contribute wastewater falls into one of those categories, you must mark 'X' in "Testing Required" column *(column 2-a)* and test for (l) all of the toxic metals, cyanide, and total phenols, and (2) the organic toxic pollutants contained in Table 2c-2 as applicable to your category, unless you qualify as a small business *(see below)*. The organic toxic pollutants are listed by GC/MS fractions on pages V-4 to V-9 in Part V-C. For example, the Organic Chemicals Industry has an asterisk in all four fractions; therefore, applicants in this category must test for all organic toxic pollutants in Part V-C. The inclusion of total phenols in Part V-C is not intended to classify total phenols as a toxic pollutant. If you are applying for a permit for a privately owned treatment works, determine your testing requirements on the basis of the industry categories of your contributors. When you determine which industry category you are in to find your testing requirements, you are not determining your category for any other purpose and you are not giving up your right to challenge your inclusion in that category *(for example, for deciding whether an effluent guideline is applicable)* before your permit is issued. For all other cases *(secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions)*, you must mark "X" in either the "Believed Present" column *(column 2-b)* or the "Believed Absent" column *(column 2-c)* for each pollutant. For every pollutant you know or have reason to believe is present in your discharge in concentrations of 10 ppb or greater, you must report quantitative data. For acrolein, acrylonitrile, 2, 4 dinitrophenol, and 2-methyl-4, 6 dinitrophenol, where you expect these four pollutants to be discharged in concentrations of 100 ppb or greater, you must report quantitative data. For every pollutant expected to be discharged in concentrations less than the thresholds specified above, you must either submit quantitative data or briefly describe the reasons the pollutant is expected to be discharged. At your request the Director, Office of Water Enforcement and Permits, may waive the requirement to test for pollutants for an industrial category or subcategory. Your request must be supported by data representatives of the industrial category or subcategory in question. The data must demonstrate that individual testing for each applicant is unnecessary, because the facilities in question discharge substantially identical levels of the pollutant, or discharge the pollutant uniformly at sufficiently low levels. If you qualify as a small business *(see below)* you are exempt from testing for the organic toxic pollutants, listed on pages V-4 to V-9 in Part C. For pollutants in intake water, see discussion in General Instructions to this item. The "Long Term Average Values" column *(column 3-c)* and "Maximum 30-day Values" column *(column 30-b)* are not compulsory but should be filled out if data are available.You are required to mark "Testing Required" for dioxin if you use or manufacture one of the following compounds:

(a) 2,4,5-trichlorophenoxy acetic acid, (2,4,5-T);

(b) 2-(2,4,5-trichlorophenoxy) propanoic acid, (Silvex, 2,4,5-TP);

(c) 2-(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate, (Erbon);

(d) 0,0-dimethyl 0-(2,4,5-trichlorophenyl) phosphorothioate, (Ronnel);

(e) 2,4,5,-trichlorophnol, (TCP); or

(f) hexachlorophene, (HCP).

If you mark "Testing Required" or "Believed Present," you must perform a screening analysis for dioxins, using gas chromotography with an electron capture detector. A TCDD standard for quantitation is not required. Describe the results of this analysis in the space provided; for example, "no measurable baseline deflection at the retention time of TCDD" or "a measurable peak within the tolerances of the retention time of TCDD." The permitting authority may require you to perform a quantitative analysis if you report a positive result. The Effluent Guidelines Division of EPA has collected and analyzed samples from some plants for the pollutants listed in Part C in the course of its BAT guidelines development program. If your effluents are sampled and analyzed as part of this program in the last three years, you may use these data to answer Part C provided that the permitting authority approves, and provided that no process change or change in raw materials or operating practices has occurred since the samples were taken that would make the analyses unrepresentative of your current discharge.

Small Business Exemption: If you qualify as a "small business," you are exempt from the reporting requirements for the organic toxic pollutants, listed on pages V-4 to V-9 in Part C. There are two ways in which you can qualify as a "small business." If your facility is a coal mine, and if your probable total annual production is less than 100,000 tons per year, you may submit past production data or estimated future production *(such as a schedule of estimated total production under 30 CFR § 795.14(c))* instead of conducting analyses for the organic toxic pollutants. If your facil-

FORM 2C — INSTRUCTIONS *(continued)*

ITEM V — A, B, C, and D *(continued)*

ity is not a coal mine, and if your gross total annual sales for the most recent three years average less than $100,000 per year *(in second quarter 1980 dollars)*, you may submit sales data for those years instead of conducting analyses for the organic toxic pollutants. The production or sales data must be for the facility which is the source of the discharge. The data should not be limited to production or sales for the process or processes which contribute to the discharge, unless those are the only processes at your facility. For sales data, in situations involving intracorporate transfer of goods and services, the transfer price per unit should approximate market prices for those goods and services as closely as possible. Sales figures for years after 1980 should be indexed to the second quarter of 1980 by using the gross national product price deflator *(second quarter of 1980* = 100). This index is available in *National Income and Product Accounts of the United States (Department of Commerce, Bureau of Economic Analysis)*.

Part V-D

List any pollutants in Table 2c-3 that you believe to be present and explain why you believe them to be present. No analysis is required, but if you have analytical data, you must report it.

Note: Under 40 CFR 117.12(a)(2), certain discharges of hazardous substances *(listed in Table 2c-4 of these instructions)* may be exempted from the requirements of section 311 of CWA, which establishes reporting requirements, civil penalties and liability for cleanup costs for spills of oil and hazardous substances. A discharge of a particular substance may be exempted if the origin, source, and amount of the discharged substances are identified in the NDPES permit application or in the permit, if the permit contains a requirement for treatment of the discharge, and if the treatment is in place. To apply for an exclusion of the discharge of any hazardous substance from the requirements of section 311, attach additional sheets of paper to your form, setting forth the following information:

1. The substance and the amount of each substance which may be discharged.
2. The origin and source of the discharge of the substance.
3. The treatment which is to be provided for the discharge by:
    a. An onsite treatment system separate from any treatment system treating your normal discharge;
    b. A treatment system designed to treat your normal discharge and which is additionally capable of treating the amount of the substance identified under paragraph 1 above; or
    c. Any combination of the above.

See 40 CFR §117.12(a)(2ind(C), published on August 29, 1979, in 44 FR 50766, or contact your Regional Office *(Table 1 on Form 1, Instructions)*, for further information on exclusions from section 311.

Item VI

This requirement applies to current use or manufacture of a toxic pollutant as an intermediate or final product or byproduct. The Director may waive or modify the requirement if you demonstrate that it would be unduly burdensome to identify each toxic pollutant and the Director has adequate information to issue your permit. You may not claim this information as confidential; however, you do not have to distinguish between use or production of the pollutants or list the amounts. Under NPDES regulations your permit will contain limits to control all pollutants you report in answer to this question, as well as all pollutants reported in Item V at levels exceeding the technology-based limits appropriate to your facility.

Item VII

Self explanatory. The permitting authority may ask you to provide additional details after your application is received.

Item IX

The Clean Water Act provides for severe penalties for submitting false information on this application form.

Section 309(c)(12) of the Clean Water Act provides that "Any person who knowingly makes any false statement, representation, or certification in any application, ... shall upon conviction, be punished by a fine of no more than $10,000 or by imprisonment for more than six months, or both."

40 CFR Part 122.22 requires the certification to be signed as follows:

(A) *For a corporation:* by a responsible corporate official. For purposes of this section, a responsible corporate official means (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policyor decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 *(in second-quarter 1980 dollars)*, if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

Note: EPA does not require specific assignments or delegation of authority to responsible corporate officers identified in §122.22(a)(1)(i). The Agency will presume that these responsible corporate officers have the requisite authority to sign permit applications unless the corporation has notified the director to the contrary. Corporate procedures governing authority to sign permit applications may provide for assignment or delegation to applicable corporate position under §122.22(a)(1)(ii) rather than to specific individuals.

(B) *For a partnership or sole proprietorship:* by a general partner or the proprietor, respectively; or

(C) *For a municipality, State, Federal, or other public agency:* by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal Agency includes (i) the chief executive officer of the Agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the Agency *(e.g., Regional Administrators of EPA)*. Applications for Group II stormwater dischargers may be signed by a duly authorized representative *(as defined in 40 CFR 122.22(b))* of the individuals identified above.

CODES FOR TREATMENT UNITS

PHYSICAL TREATMENT PROCESSES

1—A . . . . .Ammonia Stripping
1—B. . . . . .Dialysis
1—C. . . . . .Diatomaceous Earth Filtration
1—D . . . . .Distillation
1—E. . . . . .Electrodialysis
1—F. . . . . .Evaporation
1—G . . . . .Flocculation
1—H . . . . .Flotation
1—I . . . . .Foam Fractionation
1—J. . . . . .Freezing
1—K . . . . .Gas—Phase Separation
1—L. . . . . .Grinding *(Comminutors)*
1—M . . . . .Grit Removal
1—N . . . . .Microstraining
1—O . . . . .Mixing
1—P. . . . . .Moving Bed Filters
1—Q . . . . .Multimedia Filtration
1—R . . . . .Rapid Sand Filtration
1—S. . . . . .Reverse Osmosis *(Hyperfiltration)*
1—T. . . . . .Screening
1—U . . . . .Sedimentation *(Settling)*
1—V . . . . .Slow Sand Filtration
1—W . . . . .Solvent Extraction
1—X . . . . .Sorption

CHEMICAL TREATMENT PROCESSES

2—A . . . . .Carbon Adsorption
2—B. . . . . .Chemical Oxidation
2—C. . . . . .Chemical Precipitation
2—D . . . . .Coagulation
2—E. . . . . .Dechlorination
2—F. . . . . .Disinfection *(Chlorine)*
2—G . . . . .Disinfection *(Ozone)*
2—H . . . . .Disinfection *(Other)*
2—I . . . . .Electrochemical Treatment
2—J. . . . . .Ion Exchange
2—K . . . . .Neutralization
2—L. . . . . .Reduction

BIOLOGICAL TREATMENT PROCESSES

3—A . . . . .Activated Sludge
3—B. . . . . .Aerated Lagoons
3—C. . . . . .Anaerobic Treatment
3—D . . . . .Nitrification—Denitrification
3—E. . . . . .Pre—Aeration
3—F. . . . . .Spray Irrigation/Land Application
3—G . . . . .Stabilization Ponds
3—H . . . . .Trickling Filtration

OTHER PROCESSES

4—A . . . . .Discharge to Surface Water
4—B. . . . . .Ocean Discharge Through Outfall
4—C. . . . . .Reuse/Recycle of Treated Effluent
4—D . . . . .Underground Injection

SLUDGE TREATMENT AND DISPOSAL PROCESSES

5—A . . . . .Aerobic Digestion
5—B. . . . . .Anaerobic Digestion
5—C. . . . . .Belt Filtration
5—D . . . . .Centrifugation
5—E. . . . . .Chemical Conditioning
5—F. . . . . .Chlorine Treatment
5—G . . . . .Composting
5—H . . . . .Drying Beds
5—I . . . . .Elutriation
5—J. . . . . .Flotation Thickening
5—K . . . . .Freezing
5—L. . . . . .Gravity Thickening
5—M . . . . .Heat Drying
5—N . . . . .Heat Treatment
5—O . . . . .Incineration
5—P. . . . . .Land Application
5—Q . . . . .Landfill
5—R . . . . .Pressure Filtration
5—S. . . . . .Pyrolysis
5—T. . . . . .Sludge Lagoons
5—U . . . . .Vacuum Filtration
5—V . . . . .Vibration
5—W . . . . .Wet Oxidation

TABLE 2C-1

TESTING REQUIREMENTS FOR ORGANIC TOXIC POLLUTANTS INDUSTRY CATEGORY*

INDUSTRY CATEGORY	GC/MS FRACTION[1]			
	Volatile	Acid	Base/Neutral	Pesticide
Adhesives and sealants	X	X	X	—
Aluminum forming	X	X	X	—
Auto and other laundries	X	X	X	X
Battery manufacturing	X	—	X	—
Coal mining	X	X	X	X
Coil coating	X	X	X	—
Copper forming	X	X	X	—
Electric and electronic compounds	X	X	X	X
Electroplating	X	X	X	—
Explosives manufacturing	—	X	X	—
Foundries	X	X	X	—
Gum and wood chemicals	X	X	X	X
Inorganic chemicals manufacturing	X	X	X	—
Iron and steel manufacturing	X	X	X	—
Leather tanning and finishing	X	X	X	X
Mechanical products manufacturing	X	X	X	—
Nonferrous metals manufacturing	X	X	X	X
Ore mining	X	X	X	X
Organic chemicals manufacturing	X	X	X	X
Paint and ink formulation	X	X	X	X
Pesticides	X	X	X	X
Petroleum refining	X	X	X	X
Pharmaceutical preparations	X	X	X	—
Photographic equipment and supplies	X	X	X	X
Plastic and synthetic materials manufacturing	X	X	X	X
Plastic processing	X	—	—	—
Porcelain enameling	X	—	X	X
Printing and publishing	X	X	X	X
Pulp and paperboard mills	X	X	X	—
Rubber processing	X	X	X	—
Soap and detergent manufacturing	X	X	X	—
Steam electric power plants	X	X	X	X
Textile mills	X	X	X	X
Timber products processing	X	X	X	X

*See note at conclusion of 40 CFR Part 122, Appendix D (1983) for explanation of effect of suspensions on testing requirements for primary industry categories.

[1] The pollutants in each fraction are listed in Item V—C.

X = Testing required.

— = Testing not required.

TABLE 2C-2

TOXIC POLLUTANTS AND HAZARDOUS SUBSTANCES REQUIRED TO BE IDENTIFIED BY APPLICANTS IF EXPECTED TO BE PRESENT

TOXIC POLLUTANT

Asbestos

HAZARDOUS SUBSTANCES

Acetaldehyde
Allyl alcohol
Allyl chloride
Amyl acetate
Aniline
Benzonitrile
Benzyl chloride
Butyl acetate
Butylamine
Captan
Carbaryl
Carbofuran
Carbon disulfide
Chlorpyrifos
Coumaphos
Cresol
Crotonaldehyde
Cyclohexane
2,4-D (2,4-Dichlorophenoxyacetic acid)
Diazinon
Dicamba
Dichlobenil
Dichlone
2,2-Dichloropropionic acid

HAZARDOUS SUBSTANCES

Dichlorvos
Diethyl amine
Dimethyl amine
Dintrobenzene
Diquat
Disulfoton
Diuron
Epichlorohydrin
Ethion
Ethylene diamine
Ethylene dibromide
Formaldehyde
Furfural
Guthion
Isoprene
Isopropanolamine
Kelthane
Kepone
Malathion
Mercaptodimethur
Methoxychlor
Methyl mercaptan
Methyl methacrylate
Methyl parathion
Mevinphos
Mexacarbate
Monoethyl amine
Monomethyl amine

HAZARDOUS SUBSTANCES

Naled
Napthenic acid
Nitrotoluene
Parathion
Phenolsulfonate
Phosgene
Propargite
Propylene oxide
Pyrethrins
Quinoline
Resorcinol
Strontium
Strychnine
Styrene
2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)
TDE (Tetrachlorodiphenyl ethane)
2,4,5-TP [2-(2,4,5-Trichlorophenoxy) propanoic acid]
Trichlorofon
Triethanolamine
Triethylamine
Trimethylamine
Uranium
Vanadium
Vinyl acetate
Xylene
Xylenol
Zirconium

TABLE 2C-3

HAZARDOUS SUBSTANCES

1. Acetaldehyde
2. Acetic acid
3. Acetic anhydride
4. Acetone cyanohydrin
5. Acetyl bromide
6. Acetyl chloride
7. Acrolein
8. Acrylonitrile
9. Adipic acid
10. Aldrin
11. Allyl alcohol
12. Allyl chloride
13. Aluminum sulfate
14. Ammonia
15. Ammonium acetate
16. Ammonium benzoate
17. Ammonium bicarbonate
18. Ammonium bichromate
19. Ammonium bifluoride
20. Ammonium bisulfite
21. Ammonium carbamate
22. Ammonium carbonate
23. Ammonium chloride
24. Ammonium chromate
25. Ammonium citrate
26. Ammonium fluoroborate
27. Ammonium fluoride
28. Ammonium hydroxide
29. Ammonium oxalate
30. Ammonium silicofluoride
31. Ammonium sulfamate
32. Ammonium sulfide
33. Ammonium sulfite
34. Ammonium tartrate
35. Ammonium thiocyanate
36. Ammonium thiosulfate
37. Amyl acetate
38. Aniline
39. Antimony pentachloride
40. Antimony potassium tartrate
41. Antimony tribromide
42. Antimony trichloride
43. Antimony trifluoride
44. Antimony trioxide
45. Arsenic disulfide
46. Arsenic pentoxide
47. Arsenic trichloride
48. Arsenic trioxide
49. Arsenic trisulfide
50. Barium cyanide
51. Benzene
52. Benzoic acid
53. Benzonitrile
54. Benzoyl chloride
55. Benzyl chloride
56. Beryllium chloride
57. Beryllium fluoride
58. Beryllium nitrate
59. Butylacetate
60. n-Butylphthalate
61. Butylamine
62. Butyric acid
63. Cadmium acetate
64. Cadmium bromide
65. Cadmium chloride
66. Calcium arsenate
67. Calcium arsenite
68. Calcium carbide
69. Calcium chromate
70. Calcium cyanide
71. Calcium dodecylbenzenesulfonate
72. Calcium hypochlorite
73. Captan
74. Carbaryl
75. Carbofuran
76. Carbon disulfide
77. Carbon tetrachloride
78. Chlordane
79. Chlorine
80. Chlorobenzene
81. Chloroform
82. Chlorpyrifos
83. Chlorosulfonic acid
84. Chromic acetate
85. Chromic acid
86. Chromic sulfate
87. Chromous chloride
88. Cobaltous bromide
89. Cobaltous formate
90. Cobaltous sulfamate
91. Coumaphos
92. Cresol
93. Crotonaldehyde
94. Cupric acetate
95. Cupric acetoarsenite
96. Cupric chloride
97. Cupric nitrate
98. Cupric oxalate
99. Cupric sulfate
100. Cupric sulfate ammoniated
101. Cupric tartrate
102. Cyanogen chloride
103. Cyclohexane
104. 2,4-D acid (2,4-Dichlorophenoxyacetic acid)
105. 2,4-D esters (2,4-Dichlorophenoxyacetic acid esters)
106. DDT
107. Diazinon
108. Dicamba
109. Dichlobenil
110. Dichlone
111. Dichlorobenzene
112. Dichloropropane
113. Dichloropropene
114. Dichloropropene-dichloproropene mix
115. 2,2-Dichloropropionic acid
116. Dichlorvos
117. Dieldrin
118. Diethylamine
119. Dimethylamine
120. Dinitrobenzene
121. Dinitrophenol
122. Dinitrotoluene
123. Diquat
124. Disulfoton
125. Diuron
126. Dodecylbenzesulfonic acid
127. Endosulfan
128. Endrin
129. Epichlorohydrin
130. Ethion
131. Ethylbenzene
132. Ethylenediamine
133. Ethylene dibromide
134. Ethylene dichloride
135. Ethylene diaminetetraacetic acid (EDTA)
136. Ferric ammonium citrate
137. Ferric ammonium oxalate
138. Ferric chloride
139. Ferric fluoride
140. Ferric nitrate
141. Ferric sulfate
142. Ferrous ammonium sulfate
143. Ferrous chloride
144. Ferrous sulfate
145. Formaldehyde
146. Formic acid
147. Fumaric acid
148. Furfural
149. Guthion
150. Heptachlor
151. Hexachlorocyclopentadiene
152. Hydrochloric acid
153. Hydrofluoric acid
154. Hydrogen cyanide
155. Hydrogen sulfite
156. Isoprene
157. Isopropanolamine dodecylbenzenesulfonate
158. Kelthane
159. Kepone
160. Lead acetate
161. Lead arsenate
162. Lead chloride
163. Lead fluoborate
164. Lead flourite
165. Lead iodide
166. Lead nitrate
167. Lead stearate
168. Lead sulfate
169. Lead sulfide
170. Lead thiocyanate
171. Lindane
172. Lithium chromate
173. Malathion
174. Maleic acid
175. Maleic anhydride
176. Mercaptodimethur
177. Mercuric cyanide
178. Mercuric nitrate
179. Mercuric sulfate
180. Mercuric thiocyanate
181. Mercurous nitrate
182. Methoxychlor
183. Methyl mercaptan
184. Methyl methacrylate
185. Methyl parathion
186. Mevinphos
187. Mexacarbate
188. Monoethylamine
189. Monomethylamine
190. Naled
191. Napthalene
192. Napthenic acid
193. Nickel ammonium sulfate
194. Nickel chloride
195. Nickel hydroxide
196. Nickel nitrate
197. Nickel sulfate
198. Nitric acid
199. Nitrobenzene
200. Nitrogen dioxide
201. Nitrophenol
202. Nitrotoluene
203. Paraformaldehyde

TABLE 2C-4

HAZARDOUS SUBSTANCES *(continued)*

204. Parathion
205. Pentachlorophenol
206. Phenol
207. Phosgene
208. Phosphoric acid
209. Phosphorus
210. Phosphorus oxychloride
211. Phosphorus pentasulfide
212. Phosphorus trichloride
213. Polychlorinated biphenyls (PCB)
214. Potassium arsenate
215. Potassium arsenite
216. Potassium bichromate
217. Potassium chromate
218. Potassium cyanide
219. Potassium hydroxide
220. Potassium permanganate
221. Propargite
222. Propionic acid
223. Propionic anhydride
224. Propylene oxide
225. Pyrethrins
226. Quinoline
227. Resorcinol
228. Selenium oxide
229. Silver nitrate
230. Sodium
231. Sodium arsenate
232. Sodium arsenite
233. Sodium bichromate
234. Sodium bifluoride
235. Sodium bisulfite
236. Sodium chromate
237. Sodium cyanide
238. Sodium dodecylbenzenesulfonate
239. Sodium fluoride
240. Sodium hydrosulfide
241. Sodium hydroxide
242. Sodium hypochlorite
243. Sodium methylate
244. Sodium nitrite
245. Sodium phosphate (dibasic)
246. Sodium phosphate (tribasic)
247. Sodium selenite
248. Strontium chromate
249. Strychnine
250. Styrene
251. Sulfuric acid
252. Sulfur monochloride
253. 2,4,5-T acid (2,4,5-Trichlorophenoxyacetic acid)
254. 2,4,5-T amines (2,4,5-Trichlorophenoxy acetic acid amines)
255. 2,4,5-T esters (2,4,5-Trichlorophenoxy acetic acid esters)
256. 2,4,5-T salts (2,4,5-Trichlorophenoxy acetic acid salts)
257. 2,4,5-TP acid (2,4,5-Trichlorophenoxy propanoic acid)
258. 2,4,5-TP acid esters (2,4,5-Trichlorophenoxy propanoic acid esters)
259. TDE (Tetrachlorodiphenyl ethane)
260. Tetraethyl lead
261. Tetraethyl pyrophosphate
262. Thallium sulfate
263. Toluene
264. Toxaphene
265. Trichlorofon
266. Trichloroethylene
267. Trichlorophenol
268. Triethanolamine dodecylbenzenesulfonate
269. Triethylamine
270. Trimethylamine
271. Uranyl acetate
272. Uranyl nitrate
273. Vanadium pentoxide
274. Vanadyl sulfate
275. Vinyl acetate
276. Vinylidene chloride
277. Xylene
278. Xylenol
279. Zinc acetate
280. Zinc ammonium chloride
281. Zinc borate
282. Zinc bromide
283. Zinc carbonate
284. Zinc chloride
285. Zinc cyanide
286. Zinc fluoride
287. Zinc formate
288. Zinc hydrosulfonate
289. Zinc nitrate
290. Zinc phenolsulfonate
291. Zinc phosphide
292. Zinc silicofluoride
293. Zinc sulfate
294. Zirconium nitrate
295. Zirconium potassium fluoride
296. Zirconium sulfate
297. Zirconium tetrachloride

TABLE 2C-4 *(continued)*

LINE DRAWING

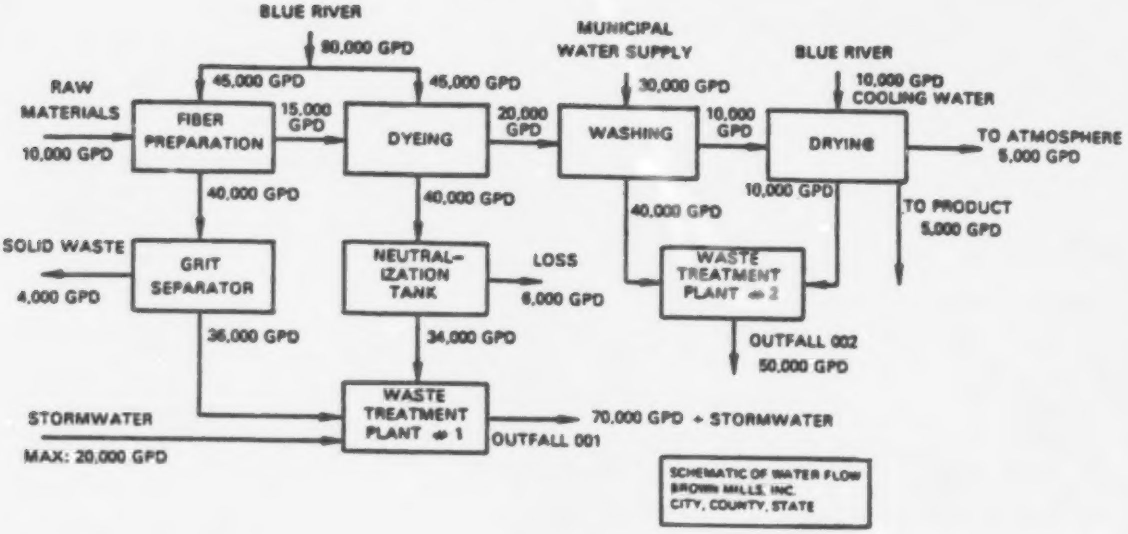
BLUE RIVER
90,000 GPD
45,000 GPD
45,000 GPD
RAW MATERIALS
10,000 GPD
FIBER PREPARATION
15,000 GPD
DYEING
MUNICIPAL WATER SUPPLY
30,000 GPD
20,000 GPD
WASHING
10,000 GPD
BLUE RIVER
10,000 GPD COOLING WATER
DRYING
TO ATMOSPHERE 5,000 GPD
40,000 GPD
40,000 GPD
40,000 GPD
10,000 GPD
TO PRODUCT 5,000 GPD
SOLID WASTE
4,000 GPD
GRIT SEPARATOR
NEUTRAL-IZATION TANK
LOSS
6,000 GPD
WASTE TREATMENT PLANT # 2
OUTFALL 002
50,000 GPD
36,000 GPD
34,000 GPD
STORMWATER
MAX: 20,000 GPD
WASTE TREATMENT PLANT # 1
70,000 GPD + STORMWATER
OUTFALL 001
SCHEMATIC OF WATER FLOW
BROWN MILLS, INC.
CITY, COUNTY, STATE

FIGURE 2C-1

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*

Please print or type in the unshaded areas only.

FORM
2C
NPDES

U.S. ENVIRONMENTAL PROTECTION AGENCY

APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER

EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS

Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER *(list)*	B. LATITUDE			C. LONGITUDE			D. RECEIVING WATER *(name)*
	1. DEG.	2. MIN.	3. SEC.	1. DEG.	2. MIN.	3. SEC.	

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined *(e.g., for certain mining activities)*, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. *(list)*	2. OPERATION(S) CONTRIBUTING FLOW		3. TREATMENT		
	a. OPERATION *(list)*	b. AVERAGE FLOW *(include units)*	a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	

OFFICIAL USE ONLY *(effluent guidelines sub-categories)*

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CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

☐ YES *(complete the following table)* ☐ NO *(go to Section III)*

1. OUTFALL NUMBER *(list)*	2. OPERATION*(s)* CONTRIBUTING FLOW *(list)*	3. FREQUENCY		4. FLOW				
		a. DAYS PER WEEK *(specify average)*	b. MONTHS PER YEAR *(specify average)*	a. FLOW RATE *(in mgd)*		b. TOTAL VOLUME *(specify with units)*		c. DURATION *(in days)*
				1. LONG TERM AVERAGE	2. MAXIMUM DAILY	1. LONG TERM AVERAGE	2. MAXIMUM DAILY	

III. PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

☐ YES *(complete Item III-B)* ☐ NO *(go to Section IV)*

B. Are the limitations in the applicable effluent guideline expressed in terms of production *(or other measure of operation)*?

☐ YES *(complete Item III-C)* ☐ NO *(go to Section IV)*

C. If you answered "yes" to Item III-B, list the quantity which represents an actual measurement of your level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. AVERAGE DAILY PRODUCTION			2. AFFECTED OUTFALLS *(list outfall numbers)*
a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. *(specify)*	

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

☐ YES *(complete the following table)* ☐ NO *(go to Item IV-B)*

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS		3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE	
	a. NO.	b. SOURCE OF DISCHARGE		a. REQUIRED	b. PROJECTED

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs *(or other environmental projects which may affect your discharges)* you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction. ☐ MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUE ON PAGE 3

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*

CONTINUED FROM PAGE 2

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding — Complete one set of tables for each outfall — Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYS[illegible]

Is any pollutant listed in Item V-C a substance or a component o[illegible]stance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ YES *(list all such pollutants below)* ☐ NO *(go to Item VI-B)*

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ YES *(identify the test(s) and describe their purposes below)* ☐ NO *(go to Section VIII)*

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

☐ YES *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* ☐ NO *(go to Section IX)*

A. NAME	B. ADDRESS	C. TELEPHONE *(area code & no.)*	D. POLLUTANTS ANALYZED *(list)*

IX. CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. NAME & OFFICIAL TITLE *(type or print)*	B. PHONE NO. *(area code & no.)*
C. SIGNATURE	D. DATE SIGNED

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PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets *(use the same format)* instead of completing these pages.
SEE INSTRUCTIONS.

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*

OUTFALL NO.

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)*

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT							3. UNITS *(specify if blank)*		4. INTAKE *(optional)*		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand *(BOD)*												
b. Chemical Oxygen Demand *(COD)*												
c. Total Organic Carbon *(TOC)*												
d. Total Suspended Solids *(TSS)*												
e. Ammonia *(as N)*												
f. Flow	VALUE		VALUE		VALUE					VALUE		
g. Temperature *(winter)*	VALUE		VALUE		VALUE			°C		VALUE		
h. Temperature *(summer)*	VALUE		VALUE		VALUE			°C		VALUE		
i. pH	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM				STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2a for any pollutant which is limited either directly, or indirectly but expressly, in an effluent limitations guideline, you must provide the results of at least one analysis for that pollutant. For other pollutants for which you mark column 2a, you must provide quantitative data or an explanation of their presence in your discharge. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. *(if available)*	2. MARK 'X'		3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Bromide (24959-67-9)														
b. Chlorine, Total Residual														
c. Color														
d. Fecal Coliform														
e. Fluoride (16984-48-8)														
f. Nitrate—Nitrite *(as N)*														

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PAGE V-1

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. *(if available)*	2. MARK 'X'		3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic *(as N)*														
h. Oil and Grease														
i. Phosphorus *(as P)*, Total (7723-14-0)														
j. Radioactivity														
(1) Alpha, Total														
(2) Beta, Total														
(3) Radium, Total														
(4) Radium 226, Total														
k. Sulfate *(as SO_4)* (14808-79-8)														
l. Sulfide *(as S)*														
m. Sulfite *(as SO_3)* (14265-45-3)														
n. Surfactants														
o. Aluminum, Total (7429-90-5)														
p. Barium, Total (7440-39-3)														
q. Boron, Total (7440-42-8)														
r. Cobalt, Total (7440-48-4)														
s. Iron, Total (7439-89-6)														
t. Magnesium, Total (7439-95-4)														
u. Molybdenum, Total (7439-98-7)														
v. Manganese, Total (7439-96-5)														
w. Tin, Total (7440-31-5)														
x. Titanium, Total (7440-32-6)														

CONTINUE ON PAGE V-3

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*	OUTFALL NUMBER

CONTINUED FROM PAGE 3 OF FORM 2-C

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a *(secondary industries, nonprocess wastewater outfalls, and nonrequired GC/MS fractions)*, mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe is absent. If you mark column 2a for any pollutant, you must provide the results of at least one analysis for that pollutant. If you mark column 2b for any pollutant, you must provide the results of at least one analysis for that pollutant if you know or have reason to believe it will be discharged in concentrations of 10 ppb or greater. If you mark column 2b for acrolein, acrylonitrile, 2,4 dinitrophenol, or 2-methyl-4, 6 dinitrophenol, you must provide the results of at least one analysis for each of these pollutants which you know or have reason to believe that you discharge in concentrations of 100 ppb or greater. Otherwise, for pollutants for which you mark column 2b, you must either submit at least one analysis or briefly describe the reasons the pollutant is expected to be discharged. Note that there are 7 pages to this part; please review each carefully. Complete one table *(all 7 pages)* for each outfall. See instructions for additional details and requirements

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)															
2M. Arsenic, Total (7440-38-2)															
3M. Beryllium, Total, 7440-41-7)															
4M. Cadmium, Total (7440-43-9)															
5M. Chromium, Total (7440-47-3)															
6M. Copper, Total (7440-50-8)															
7M. Lead, Total (7439-92-1)															
8M. Mercury, Total (7439-97-6)															
9M. Nickel, Total (7440-02-0)															
10M. Selenium, Total (7782-49-2)															
11M. Silver, Total (7440-22-4)															
12M. Thallium, Total (7440-28-0)															
13M. Zinc, Total (7440-66-6)															
14M. Cyanide, Total (57-12-5)															
15M. Phenols, Total															
DIOXIN															
2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6)				DESCRIBE RESULTS											

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION — VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)															
2V. Acrylonitrile (107-13-1)															
3V. Benzene (71-43-2)															
4V. Bis *(Chloromethyl)* Ether (542-88-1)															
5V. Bromoform (75-25-2)															
6V. Carbon Tetrachloride (56-23-5)															
7V. Chlorobenzene (108-90-7)															
8V. Chlorodibromomethane (124-48-1)															
9V. Chloroethane (75-00-3)															
10V. 2-Chloroethylvinyl Ether (110-75-8)															
11V. Chloroform (67-66-3)															
12V. Dichlorobromomethane (75-27-4)															
13V. Dichlorodifluoromethane (75-71-8)															
14V. 1,1-Dichloroethane (75-34-3)															
15V. 1,2-Dichloroethane (107-06-2)															
16V. 1,1-Dichloroethylene (75-35-4)															
17V. 1,2-Dichloropropane (78-87-5)															
18V. 1,3-Dichloropropylene (542-75-6)															
19V. Ethylbenzene (100-41-4)															
20V. Methyl Bromide (74-83-9)															
21V. Methyl Chloride (74-87-3)															

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EPA I.D. NUMBER (*copy from Item 1 of Form 1*) | OUTFALL NUMBER

1. POLLUTANT AND CAS NUMBER (*if available*)	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE (*optional*)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (*if available*)		c. LONG TERM AVRG. VALUE (*if available*)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – VOLATILE COMPOUNDS (*continued*)															
22V. Methylene Chloride (75-09-2)															
23V. 1,1,2,2-Tetrachloroethane (79-34-5)															
24V. Tetrachloroethylene (127-18-4)															
25V. Toluene (108-88-3)															
26V. 1,2-Trans-Dichloroethylene (156-60-5)															
27V. 1,1,1-Trichloroethane (71-55-6)															
28V. 1,1,2-Trichloroethane (79-00-5)															
29V. Trichloroethylene (79-01-6)															
30V. Trichlorofluoromethane (75-69-4)															
31V. Vinyl Chloride (75-01-4)															
GC/MS FRACTION – ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)															
2A. 2,4-Dichlorophenol (120-83-2)															
3A. 2,4-Dimethylphenol (105-67-9)															
4A. 4,6-Dinitro-O-Cresol (534-52-1)															
5A. 2,4-Dinitrophenol (51-28-5)															
6A. 2-Nitrophenol (88-75-5)															
7A. 4-Nitrophenol (100-02-7)															
8A. P-Chloro-M-Cresol (59-50-7)															
9A. Pentachlorophenol (87-86-5)															
10A. Phenol (108-95-2)															
11A. 2,4,6-Trichlorophenol (88-06-2)															

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)															
2B. Acenaphtylene (208-96-8)															
3B. Anthracene (120-12-7)															
4B. Benzidine (92-87-5)															
5B. Benzo *(a)* Anthracene (56-55-3)															
6B. Benzo *(a)* Pyrene (50-32-8)															
7B. 3,4-Benzofluoranthene (205-99-2)															
8B. Benzo *(ghi)* Perylene (191-24-2)															
9B. Benzo *(k)* Fluoranthene (207-08-9)															
10B. Bis *(2-Chloroethoxy)* Methane (111-91-1)															
11B. Bis *(2-Chloroethyl)* Ether (111-44-4)															
12B. Bis *(2-Chloroisopropyl)* Ether (102-80-1)															
13B. Bis *(2-Ethylhexyl)* Phthalate (117-81-7)															
14B. 4-Bromophenyl Phenyl Ether (101-55-3)															
15B. Butyl Benzyl Phthalate (85-68-7)															
16B. 2-Chloronaphthalene (91-58-7)															
17B. 4-Chlorophenyl Phenyl Ether (7005-72-3)															
18B. Chrysene (218-01-9)															
19B. Dibenzo *(a,h)* Anthracene (53-70-3)															
20B. 1,2-Dichlorobenzene (95-50-1)															
21B. 1,3-Dichlorobenzene (541-73-1)															

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EPA I.D. NUMBER *(copy from Item 1 of Form 1)* | OUTFALL NUMBER

CONTINUED FROM PAGE V-6

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS *(continued)*															
22B. 1,4-Dichlorobenzene (106-46-7)															
23B. 3,3'-Dichlorobenzidine (91-94-1)															
24B. Diethyl Phthalate (84-66-2)															
25B. Dimethyl Phthalate (131-11-3)															
26B. Di-N-Butyl Phthalate (84-74-2)															
27B. 2,4-Dinitrotoluene (121-14-2)															
28B. 2,6-Dinitrotoluene (606-20-2)															
29B. Di-N-Octyl Phthalate (117-84-0)															
30B. 1,2-Diphenylhydrazine *(as Azobenzene)* (122-66-7)															
31B. Fluoranthene (206-44-0)															
32B. Fluorene (86-73-7)															
33B. Hexachlorobenzene (118-74-1)															
34B. Hexachlorobutadiene (87-68-3)															
35B. Hexachlorocyclopentadiene (77-47-4)															
36B. Hexachloroethane (67-72-1)															
37B. Indeno *(1,2,3-cd)* Pyrene (193-39-5)															
38B. Isophorone (78-59-1)															
39B. Naphthalene (91-20-3)															
40B. Nitrobenzene (98-95-3)															
41B. N-Nitrosodimethylamine (62-75-9)															
42B. N-Nitrosodi-N-Propylamine (621-64-7)															

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CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS *(continued)*															
43B. N-Nitrosodiphenylamine (86-30-6)															
44B. Phenanthrene (85-01-8)															
45B. Pyrene (129-00-0)															
46B. 1,2,4 - Trichlorobenzene (120-82-1)															
GC/MS FRACTION – PESTICIDES															
1P. Aldrin (309-00-2)															
2P. α-BHC (319-84-6)															
3P. β-BHC (319-85-7)															
4P. γ-BHC (58-89-9)															
5P. δ-BHC (319-86-8)															
6P. Chlordane (57-74-9)															
7P. 4,4'-DDT (50-29-3)															
8P. 4,4'-DDE (72-55-9)															
9P. 4,4'-DDD (72-54-8)															
10P. Dieldrin (60-57-1)															
11P. α-Endosulfan (115-29-7)															
12P. β-Endosulfan (115-29-7)															
13P. Endosulfan Sulfate (1031-07-8)															
14P. Endrin (72-20-8)															
15P. Endrin Aldehyde (7421-93-4)															
16P. Heptachlor (76-44-8)															

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EPA I.D. NUMBER *(copy from Item 1 of Form 1)*	OUTFALL NUMBER

CONTINUED FROM PAGE V-8

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION – PESTICIDES *(continued)*															
17P. Heptachlor Epoxide (1024-57-3)															
18P. PCB-1242 (53469-21-9)															
19P. PCB-1254 (11097-69-1)															
20P. PCB-1221 (11104-28-2)															
21P. PCB-1232 (11141-16-5)															
22P. PCB-1248 (12672-29-6)															
23P. PCB-1260 (11096-82-5)															
24P. PCB-1016 (12674-11-2)															
25P. Toxaphene (8001-35-2)															

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[FR Doc. 84-25227 Filed 9-25-84; 8:45 am]

BILLING CODE 6560-50-C

TABLE A-1 COMPARISON OF ONTARIO, U.S. EPA, AND WISCONSIN MONITORING REQUIREMENTS

Analytical Test Group No.	 Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c] 1
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	2/W
2	Cyanide	Cyanide	3/Q	5A	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	D
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	2/W
4b		Total Kjeldahl nitrogen	3/Q	5A	
		Nitrate	3/Q	5A	
		Nitrite	3/Q	5A	
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q		
		Total organic carbon (TOC)	3/W	5A	
6	Total phosphorus	Total phosphorus	3/W	5A	
7	Specific conductance	Specific conductance	3/Q		
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	2/W
		Volatile suspended solids (VSS)	D		
9	Total metals	Aluminum	3/Q	5A	
		Beryllium	3/Q	5A	
		Cadmium	3/Q	5A	
		Chromium	3/Q[d]	5A	2/W
		Cobalt	3/Q	5A	
		Copper	3/Q	5A	
		Lead	3/Q	5A	
		Molybdenum	3/Q	5A	
		Nickel	3/Q	5A	
		Silver	3/Q	5A	
		Thallium	3/Q	5A	
		Vanadium	3/Q		
		Zinc	3/Q[d]	5A	

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21(g)(7)].

(c) 1 = Murphy Oil USA, Inc.

(d) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-1 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]
No.	Name				1
10	Hydrides	Antimony	3/Q	5A	
		Arsenic	3/Q	5A	
		Selenium	3/Q	5A	
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		2/W
12	Mercury	Mercury	3/Q	5A	
13	Total alkyl lead	Tetra-alkyl lead	3/Q		
		Tri-alkyl lead	3/Q		
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	2/W
15	Sulphide	Sulphide	3/W		2/W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A	
		1,1,2-Trichloroethane	3/Q	5A	
		1,1-Dichloroethane	3/Q	5A	
		1,1-Dichloroethylene	3/Q	5A	
		1,2-Dichlorobenzene	3/Q		
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A	
		1,2-Dichloropropane	3/Q	5A	
		1,3-Dichlorobenzene	3/Q		
		1,4-Dichlorobenzene	3/Q		
		Bromoform	3/Q	5A	
		Bromomethane	3/Q	5A	
		Carbon tetrachloride	3/Q	5A	
		Chlorobenzene	3/Q	5A	
		Chloroform	3/Q	5A	
		Chloromethane	3/Q	5A	
		Cis-1,3-Dichloropropylene	3/Q	5A	
		Dibromochloromethane	3/Q	5A	
		Dichlorobromomethane	3/Q	5A	
		Ethylene dibromide	3/Q		
		Methylene chloride	3/Q	5A	
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A	
		Trans-1,2-Dichloroethylene	3/Q	5A	
		Trans-1,3-Dichloropropylene	3/Q		
		Trichloroethylene	3/Q	5A	
		Trichlorofluoromethane	3/Q	5A	
		Vinyl chloride (Chloroethylene)	3/Q	5A	
17	Volatiles, Non-Halogenated	Benzene	3/W	5A	
		Ethylbenzene	3/W	5A	
		Methyl ethyl ketone	3/Q		

TABLE A-1 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 1
		Styrene	3/Q		
		Toluene	3/W	5A	
		o-Xylene	3/W		
		m-Xylene and p-Xylene	3/W		
18	Volatiles, Water Soluble	Acrolein	3A	5A	
		Acrylonitrile	3A	5A	
		1,3-Butadiene	3A		
19	Extractables, Base Neutral	Acenaphthene	3/Q		
		5-nitro Acenaphthene	3/Q		
		Acenaphthylene	3/Q		
		Anthracene	3/Q		
		Benz(a)anthracene	3/Q		
		Benzo(a)pyrene	3/Q		
		Benzo(b)fluoranthene	3/Q		
		Benzo(ghi)perylene	3/Q		
		Benzo(k)fluoranthene	3/Q		
		Camphene	3/Q		
		1-Chloronaphthalene	3/Q		
		2-Chloronaphthalene	3/Q		
		Chrysene	3/Q		
		Dibenz(a,h)anthracene	3/Q		
		Fluoranthene	3/Q		
		Fluorene	3/Q		
		Indeno(1,2,3-cd)pyrene	3/Q		
		Indole	3/Q		
		1-Methylnaphthalene	3/Q		
		2-Methylnaphthalene	3/Q		
		Naphthalene	3/Q		
		Perylene	3/Q		
		Phenanthrene	3/Q		
		Pyrene	3/Q		
		Benzyl butyl phthalate	3A		
		Bis(2-ethyhexyl) phthalate	3A		
		Di-n-butyl phthalate	3A		
		Di-n-octyl phthalate	3A		
		4-Bromophenyl phenyl ether	3A		
		4-Chlorophenyl phenyl ether	3A		
		Bis(2-chloroisopropyl)ether	3A		
		Bis(2-chloroethyl)ether	3A		
		Diphenyl ether	3A		

TABLE A-1 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]
No.	Name				1
		2,4-Dinitrotoluene	3A		
		2,6-Dinitrotoluene	3A		
		Bis(2-chloroethoxy)methane	3A		
		Diphenylamine	3A		
		N-Nitrosodiphenylamine	3A		
		N-Nitrosodi-n-propylamine	3A		
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q		
		2,3,4,6-Tetrachlorophenol	3/Q		
		2,3,5,6-Tetrachlorophenol	3/Q		
		2,3,4-Trichlorophenol	3/Q		
		2,3,5-Trichlorophenol	3/Q		
		2,4,5-Trichlorophenol	3/Q		
		2,4,6-Trichlorophenol	3/Q		
		2,4-Dimethyl phenol	3/Q		
		2,4-Dinitrophenol	3/Q		
		2,4-Dichlorophenol	3/Q		
		2,6-Dichlorophenol	3/Q		
		4,6-Dinitro-o-cresol	3/Q		
		2-Chlorophenol	3/Q		
		4-Chloro-3-methylphenol	3/Q		
		4-Nitrophenol	3/Q		
		m-Cresol	3/Q		
		o-Cresol	3/Q		
		p-Cresol	3/Q		
		Pentachlorophenol	3/Q		
		Phenol	3/Q		
21	Extractables, Phenoxy Acid Herbicides				
22	Extractables, Organochlorine Pesticides				
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A		
		1,2,3,5-Tetrachlorobenzene	3A		
		1,2,4,5-Tetrachlorobenzene	3A		
		1,2,3-Trichlorobenzene	3A		
		1,2,4-Trichlorobenzene	3A		
		2,4,5-Trichlorotoluene	3A		
		Hexachlorobenzene	3A		
		Hexachlorobutadiene	3A		
		Hexachlorocyclopentadiene	3A		

TABLE A-1 (Cont.)

Analytical Test Group No.	Name	Characterization Parameters	Ontario(a)	U.S. EPA(b)	Petroleum Refinery(c) 1
		Hexachloroethane	3A		
		Octachlorostyrene	3A		
		Pentachlorobenzene	3A		
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans				
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A		
		Octachlorodibenzo-p-dioxin	3A		
		Octachlorodibenzofuran	3A		
		Total heptachlorinated dibenzo-p-dioxins	3A		
		Total hexachlorinated dibenzofurans	3A		
		Total hexachlorinated dibenzo-p-dioxins	3A		
		Total heptachlorinated dibenzofurans	3A		
		Total pentachlorinated dibenzo-p-dioxins	3A		
		Total pentachlorinated dibenzofurans	3A		
		Total tetrachlorinated dibenzo-p-dioxins	3A		
		Total tetrachlorinated dibenzofurans			
25	Solvent Extractables	Oil and grease	3/W	5A	2/W
26	Fatty and Resin Acids				
27	PCBs	PCBs (Aroclors)	3A		
	Additional Requirements	Toxicity testing	M		
		Flow	C	5A	D
	Additional State or U.S. EPA Requirements				
		Acridine			
		Aldrin			
		Benzidine			
		Bis chloromethyl ether		5A	
		BOD5 % removal			
		Carbonaceous BOD			
		Chloride			
		4-Chloro-n-cresol			
		Dichlorodifluoromethane		5A	
		p,p'-DDD			
		p,p'-DDE			
		p,p'-DDT			
		3,3'-Dichlorobenzidine			
		Dibromomethane			
		Diethyl phthalate			
		Dimethyl phthalate			

TABLE A-1 (Cont.)

Analytical Test Group					Petroleum Refinery[c]
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	1
		Dieldrin			
		Dissolved oxygen			
		1,4-dioxane			
		Endosulfan sulfate			
		Endrin aldehyde			
		Fecal coliforms		5A	
		Free cyanide			
		First stage oxygen demand (FSOD)			
		Fluoride		5A	
		Hydrogen sulfide			
		Heptachlor			
		Heptachlor epoxide			
		Iron		5A	
		Un-ionized ammonia			
		Isophorone			
		Manganese		5A	
		MBAS			
		Nitrobenzene			
		2-Nitrophenol			
		Temperature		5A	
		Thermal load			
		TSS % removal			
		Vinyl bromide			
		BOD5		5A	2/W
		1,1,1-Trichloroethane			
		Ethyl chloride			
		2-Chloroethylvinylether			
		Total dissolved solids			
		Bromide		5A	
		Chlorine, total residue		5A	
		Color		5A	
		Radioactivity		5A	
		Sulfate as SO_4		5A	
		Sulfite, sulfide		5A	
		Surfacants		5A	
		Barium		5A	
		Boron		5A	
		Magnesium		5A	
		Tin		5A	
		Titanium		5A	

TABLE A-2 COMPARISON OF ONTARIO, U.S. EPA, AND MINNESOTA MONITORING REQUIREMENTS

Analytical Test Group					Petroleum Refinery[(c)]	
No.	Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	2	3
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	W	2/W
2	Cyanide	Cyanide	3/Q	5A		
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	C	C
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	2/W	2/W
4b		Total Kjeldahl nitrogen	3/Q	5A		
		Nitrate	3/Q	5A		
		Nitrite	3/Q	5A		
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q			
		Total organic carbon (TOC)	3/W	5A		
6	Total phosphorus	Total phosphorus	3/W	5A		
7	Specific conductance	Specific conductance	3/Q			
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	2/W	2/W
		Volatile suspended solids (VSS)	D			
9	Total metals	Aluminum	3/Q	5A		
		Beryllium	3/Q	5A		
		Cadmium	3/Q	5A		
		Chromium	3/Q[(d)]	5A	W	3/W
		Cobalt	3/Q	5A		
		Copper	3/Q	5A		
		Lead	3/Q	5A		
		Molybdenum	3/Q	5A		
		Nickel	3/Q	5A		
		Silver	3/Q	5A		
		Thallium	3/Q	5A		
		Vanadium	3/Q			
		Zinc	3/Q[(d)]	5A		

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 2 = Ashland Oil, Inc.; 3 = Koch Refining Company.

(d) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-2 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario$^{(a)}$	U.S. EPA$^{(b)}$	Petroleum Refinery$^{(c)}$ 2	Petroleum Refinery$^{(c)}$ 3
10	Hydrides	Antimony	3/Q	5A		
		Arsenic	3/Q	5A		
		Selenium	3/Q	5A		
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		W	3/W
12	Mercury	Mercury	3/Q	5A		
13	Total alkyl lead	Tetra-alkyl lead	3/Q			
		Tri-alkyl lead	3/Q			
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	2/W	3/W
15	Sulphide	Sulphide	3/W		W	2/W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A		
		1,1,2-Trichloroethane	3/Q	5A		
		1,1-Dichloroethane	3/Q	5A		
		1,1-Dichloroethylene	3/Q	5A		
		1,2-Dichlorobenzene	3/Q			
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A		
		1,2-Dichloropropane	3/Q	5A		
		1,3-Dichlorobenzene	3/Q			
		1,4-Dichlorobenzene	3/Q			
		Bromoform	3/Q	5A		
		Bromomethane	3/Q	5A		
		Carbon tetrachloride	3/Q	5A		
		Chlorobenzene	3/Q	5A		
		Chloroform	3/Q	5A		
		Chloromethane	3/Q	5A		
		Cis-1,3-Dichloropropylene	3/Q	5A		
		Dibromochloromethane	3/Q	5A		
		Dichlorobromomethane	3/Q	5A		
		Ethylene dibromide	3/Q			
		Methylene chloride	3/Q	5A		
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A		
		Trans-1,2-Dichloroethylene	3/Q	5A		
		Trans-1,3-Dichloropropylene	3/Q			
		Trichloroethylene	3/Q	5A		
		Trichlorofluoromethane	3/Q	5A		
		Vinyl chloride (Chloroethylene)	3/Q	5A		
17	Volatiles, Non-Halogenated	Benzene	3/W	5A		
		Ethylbenzene	3/W	5A		
		Methyl ethyl ketone	3/Q			

TABLE A-2 (Cont.)

Analytical Test Group					Petroleum Refinery(c)	
No.	Name	Characterization Parameters	Ontario(a)	U.S. EPA(b)	2	3
		Styrene	3/Q			
		Toluene	3/W	5A		
		o-Xylene	3/W			
		m-Xylene and p-Xylene	3/W			
18	Volatiles, Water Soluble	Acrolein	3A	5A		
		Acrylonitrile	3A	5A		
		1,3-Butadiene	3A			
19	Extractables, Base Neutral	Acenaphthene	3/Q			
		5-nitro Acenaphthene	3/Q			
		Acenaphthylene	3/Q			
		Anthracene	3/Q			
		Benz(a)anthracene	3/Q			
		Benzo(a)pyrene	3/Q			
		Benzo(b)fluoranthene	3/Q			
		Benzo(ghi)perylene	3/Q			
		Benzo(k)fluoranthene	3/Q			
		Camphene	3/Q			
		1-Chloronaphthalene	3/Q			
		2-Chloronaphthalene	3/Q			
		Chrysene	3/Q			
		Dibenz(a,h)anthracene	3/Q			
		Fluoranthene	3/Q			
		Fluorene	3/Q			
		Indeno(1,2,3-cd)pyrene	3/Q			
		Indole	3/Q			
		1-Methylnaphthalene	3/Q			
		2-Methylnaphthalene	3/Q			
		Naphthalene	3/Q			
		Perylene	3/Q			
		Phenanthrene	3/Q			
		Pyrene	3/Q			
		Benzyl butyl phthalate	3A			
		Bis(2-ethyhexyl) phthalate	3A			
		Di-n-butyl phthalate	3A			
		Di-n-octyl phthalate	3A			
		4-Bromophenyl phenyl ether	3A			
		4-Chlorophenyl phenyl ether	3A			
		Bis(2-chloroisopropyl)ether	3A			
		Bis(2-chloroethyl)ether	3A			
		Diphenyl ether	3A			

TABLE A-2 (Cont.)

Analytical Test Group					Petroleum Refinery[c]	
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	2	3
		2,4-Dinitrotoluene	3A			
		2,6-Dinitrotoluene	3A			
		Bis(2-chloroethoxy)methane	3A			
		Diphenylamine	3A			
		N-Nitrosodiphenylamine	3A			
		N-Nitrosodi-n-propylamine	3A			
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q			
		2,3,4,6-Tetrachlorophenol	3/Q			
		2,3,5,6-Tetrachlorophenol	3/Q			
		2,3,4-Trichlorophenol	3/Q			
		2,3,5-Trichlorophenol	3/Q			
		2,4,5-Trichlorophenol	3/Q			
		2,4,6-Trichlorophenol	3/Q			
		2,4-Dimethyl phenol	3/Q			
		2,4-Dinitrophenol	3/Q			
		2,4-Dichlorophenol	3/Q			
		2,6-Dichlorophenol	3/Q			
		4,6-Dinitro-o-cresol	3/Q			
		2-Chlorophenol	3/Q			
		4-Chloro-3-methylphenol	3/Q			
		4-Nitrophenol	3/Q			
		m-Cresol	3/Q			
		o-Cresol	3/Q			
		p-Cresol	3/Q			
		Pentachlorophenol	3/Q			
		Phenol	3/Q			
21	Extractables, Phenoxy Acid Herbicides					
22	Extractables, Organochlorine Pesticides					
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A			
		1,2,3,5-Tetrachlorobenzene	3A			
		1,2,4,5-Tetrachlorobenzene	3A			
		1,2,3-Trichlorobenzene	3A			
		1,2,4-Trichlorobenzene	3A			
		2,4,5-Trichlorotoluene	3A			
		Hexachlorobenzene	3A			
		Hexachlorobutadiene	3A			
		Hexachlorocyclopentadiene	3A			

TABLE A-2 (Cont.)

Analytical Test Group					Petroleum Refinery(c)	
No.	Name	Characterization Parameters	Ontario(a)	U.S. EPA(b)	2	3
		Hexachloroethane	3A			
		Octachlorostyrene	3A			
		Pentachlorobenzene	3A			
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans					
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A			
		Octachlorodibenzo-p-dioxin	3A			
		Octachlorodibenzofuran	3A			
		Total heptachlorinated dibenzo-p-dioxins	3A			
		Total hexachlorinated dibenzofurans	3A			
		Total hexachlorinated dibenzo-p-dioxins	3A			
		Total heptachlorinated dibenzofurans	3A			
		Total pentachlorinated dibenzo-p-dioxins	3A			
		Total pentachlorinated dibenzofurans	3A			
		Total tetrachlorinated dibenzo-p-dioxins	3A			
		Total tetrachlorinated dibenzofurans				
25	Solvent Extractables	Oil and grease	3/W	5A	2/W	2/W
26	Fatty and Resin Acids					
27	PCBs	PCBs (Aroclors)	3A			
	Additional Requirements	Toxicity testing	M			
		Flow	C	5A	C	C
	Additional State or U.S. EPA Requirements					
		Acridine				
		Aldrin				
		Benzidine				
		Bis chloromethyl ether		5A		
		BOD5 % removal				
		Carbonaceous BOD				
		Chloride				
		4-Chloro-m-cresol				
		Dichlorodifluoromethane		5A		
		p,p'-DDD				
		p,p'-DDE				
		p,p'-DDT				
		3,3'-Dichlorobenzidine				
		Dibromomethane				
		Diethyl phthalate				
		Dimethyl phthalate				

TABLE A-2 (Cont.)

Analytical Test Group					Petroleum Refinery[(c)]	
No.	Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	2	3
		Dieldrin				
		Dissolved oxygen				
		1,4-dioxane				
		Endosulfan sulfate				
		Endrin aldehyde				
		Fecal coliforms		5A		
		Free cyanide				
		First stage oxygen demand (FSOD)				
		Fluoride		5A		
		Hydrogen sulfide				
		Heptachlor				
		Heptachlor epoxide				
		Iron		5A		
		Un-ionized ammonia			2/W	2/W
		Isophorone				
		Manganese		5A		
		MBAS				
		Nitrobenzene				
		2-Nitrophenol				
		Temperature		5A	C	3/D
		Thermal load				
		TSS % removal				
		Vinyl bromide				
		BOD5		5A	2/W	2/W
		1,1,1-Trichloroethane				
		Ethyl chloride				
		2-Chloroethylvinylether				
		Total dissolved solids				
		Bromide		5A		
		Chlorine, total residue		5A		
		Color		5A		
		Radioactivity		5A		
		Sulfate as SO_4		5A		
		Sulfite, sulfide		5A		
		Surfactants		5A		
		Barium		5A		
		Boron		5A		
		Magnesium		5A		
		Tin		5A		
		Titanium		5A		

TABLE A-3 COMPARISON OF ONTARIO, U.S. EPA, AND MICHIGAN MONITORING REQUIREMENTS

Analytical Test Group					Petroleum Refinery[c]		
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	5[d]	4[e]	6[e]
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	2/W		
2	Cyanide	Cyanide	3/Q	5A			
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	2/W		
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	2/W		
		Total Kjeldahl nitrogen	3/Q	5A			
4b		Nitrate	3/Q	5A			
		Nitrite	3/Q	5A			
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q				
		Total organic carbon (TOC)	3/W	5A			
6	Total phosphorus	Total phosphorus	3/W	5A			
7	Specific conductance	Specific conductance	3/Q				
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	2/W		
		Volatile suspended solids (VSS)	D				
9	Total metals	Aluminum	3/Q	5A			
		Beryllium	3/Q	5A			
		Cadmium	3/Q	5A			
		Chromium	3/Q[f]	5A	2/W		
		Cobalt	3/Q	5A			
		Copper	3/Q	5A			
		Lead	3/Q	5A			
		Molybdenum	3/Q	5A			
		Nickel	3/Q	5A			
		Silver	3/Q	5A			
		Thallium	3/Q	5A			
		Vanadium	3/Q				

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 5 = Total Petroleum, Inc.; 4 = Lakeside Refining Company; 6 = Mobile Oil, Woodhaven Lube Plant and Terminal.

(d) Interim limits until 31 March 1988.

(e) No process water discharge listed.

(f) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-3 (Cont.)

Analytical Test Group					Petroleum Refinery[c]		
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	5[d]	4[e]	6[e]
		Zinc	3/Q[f]	5A			
10	Hydrides	Antimony	3/Q	5A			
		Arsenic	3/Q	5A			
		Selenium	3/Q	5A			
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		2/W		
12	Mercury	Mercury	3/Q	5A			
13	Total alkyl lead	Tetra-alkyl lead	3/Q				
		Tri-alkyl lead	3/Q				
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	2/W		
15	Sulphide	Sulphide	3/W		2/W		
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A			
		1,1,2-Trichloroethane	3/Q	5A			
		1,1-Dichloroethane	3/Q	5A			
		1,1-Dichloroethylene	3/Q	5A			
		1,2-Dichlorobenzene	3/Q				
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A			
		1,2-Dichloropropane	3/Q	5A			
		1,3-Dichlorobenzene	3/Q				
		1,4-Dichlorobenzene	3/Q				
		Bromoform	3/Q	5A			
		Bromomethane	3/Q	5A			
		Carbon tetrachloride	3/Q	5A			
		Chlorobenzene	3/Q	5A			
		Chloroform	3/Q	5A			
		Chloromethane	3/Q	5A			
		Cis-1,3-Dichloropropylene	3/Q	5A			
		Dibromochloromethane	3/Q	5A			
		Dichlorobromomethane	3/Q	5A			
		Ethylene dibromide	3/Q				
		Methylene chloride	3/Q	5A			
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A			
		Trans-1,2-Dichloroethylene	3/Q	5A			
		Trans-1,3-Dichloropropylene	3/Q				
		Trichloroethylene	3/Q	5A			
		Trichlorofluoromethane	3/Q	5A			
		Vinyl chloride (Chloroethylene)	3/Q	5A			

TABLE A-3 (Cont.)

Analytical Test Group					Petroleum Refinery[c]		
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	5[d]	4[e]	6[e]
17	Volatiles, Non-Halogenated	Benzene	3/W	5A			
		Ethylbenzene	3/W	5A			
		Methyl ethyl ketone	3/Q				
		Styrene	3/Q				
		Toluene	3/W	5A			
		o-Xylene	3/W				
		m-Xylene and p-Xylene	3/W				
18	Volatiles, Water Soluble	Acrolein	3A	5A			
		Acrylonitrile	3A	5A			
		1,3-Butadiene	3A				
19	Extractables, Base Neutral	Acenaphthene	3/Q				
		5-nitro Acenaphthene	3/Q				
		Acenaphthylene	3/Q				
		Anthracene	3/Q				
		Benz(a)anthracene	3/Q				
		Benzo(a)pyrene	3/Q				
		Benzo(b)fluoranthene	3/Q				
		Benzo(ghi)perylene	3/Q				
		Benzo(k)fluoranthene	3/Q				
		Camphene	3/Q				
		1-Chloronaphthalene	3/Q				
		2-Chloronaphthalene	3/Q				
		Chrysene	3/Q				
		Dibenz(a,h)anthracene	3/Q				
		Fluoranthene	3/Q				
		Fluorene	3/Q				
		Indeno(1,2,3-cd)pyrene	3/Q				
		Indole	3/Q				
		1-Methylnaphthalene	3/Q				
		2-Methylnaphthalene	3/Q				
		Naphthalene	3/Q				
		Perylene	3/Q				
		Phenanthrene	3/Q				
		Pyrene	3/Q				
		Benzyl butyl phthalate	3A				
		Bis(2-ethyhexyl) phthalate	3A				
		Di-n-butyl phthalate	3A				
		Di-n-octyl phthalate	3A				
		4-Bromophenyl phenyl ether	3A				
		4-Chlorophenyl phenyl ether	3A				

TABLE A-3 (Cont.)

Analytical Test Group					Petroleum Refinery(c)		
No.	Name	Characterization Parameters	Ontario(a)	U.S. EPA(b)	5(d)	4(e)	6(e)
		Bis(2-chloroisopropyl)ether	3A				
		Bis(2-chloroethyl)ether	3A				
		Diphenyl ether	3A				
		2,4-Dinitrotoluene	3A				
		2,6-Dinitrotoluene	3A				
		Bis(2-chloroethoxy)methane	3A				
		Diphenylamine	3A				
		N-Nitrosodiphenylamine	3A				
		N-Nitrosodi-n-propylamine	3A				
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q				
		2,3,4,6-Tetrachlorophenol	3/Q				
		2,3,5,6-Tetrachlorophenol	3/Q				
		2,3,4-Trichlorophenol	3/Q				
		2,3,5-Trichlorophenol	3/Q				
		2,4,5-Trichlorophenol	3/Q				
		2,4,6-Trichlorophenol	3/Q				
		2,4-Dimethyl phenol	3/Q				
		2,4-Dinitrophenol	3/Q				
		2,4-Dichlorophenol	3/Q				
		2,6-Dichlorophenol	3/Q				
		4,6-Dinitro-o-cresol	3/Q				
		2-Chlorophenol	3/Q				
		4-Chloro-3-methylphenol	3/Q				
		4-Nitrophenol	3/Q				
		m-Cresol	3/Q				
		o-Cresol	3/Q				
		p-Cresol	3/Q				
		Pentachlorophenol	3/Q				
		Phenol	3/Q				
21	Extractables, Phenoxy Acid Herbicides						
22	Extractables, Organochlorine Pesticides						
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A				
		1,2,3,5-Tetrachlorobenzene	3A				
		1,2,4,5-Tetrachlorobenzene	3A				
		1,2,3-Trichlorobenzene	3A				

TABLE A-3 (Cont.)

Analytical Test Group					Petroleum Refinery[c]		
No.	**Name**	Characterization Parameters	Ontario[a]	U.S. EPA[b]	5[d]	4[e]	6[e]
		1,2,4-Trichlorobenzene	3A				
		2,4,5-Trichlorotoluene	3A				
		Hexachlorobenzene	3A				
		Hexachlorobutadiene	3A				
		Hexachlorocyclopentadiene	3A				
		Hexachloroethane	3A				
		Octachlorostyrene	3A				
		Pentachlorobenzene	3A				
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans						
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A				
		Octachlorodibenzo-p-dioxin	3A				
		Octachlorodibenzofuran	3A				
		Total heptachlorinated dibenzo-p-dioxins	3A				
		Total hexachlorinated dibenzofurans	3A				
		Total hexachlorinated dibenzo-p-dioxins	3A				
		Total heptachlorinated dibenzofurans	3A				
		Total pentachlorinated dibenzo-p-dioxins	3A				
		Total pentachlorinated dibenzofurans	3A				
		Total tetrachlorinated dibenzo-p-dioxins	3A				
		Total tetrachlorinated dibenzofurans	3A				
25	Solvent Extractables	Oil and grease	3/W	5A	2/W		
26	Fatty and Resin Acids						
27	PCBs	PCBs (Aroclors)	3A				
	Additional Requirements	Toxicity testing	M				
		Flow	C	5A	5/W		
	Additional State or U.S. EPA Requirements						
		Acridine					
		Aldrin					
		Benzidine					
		Bis chloromethyl ether		5A			
		BOD5 % removal					
		Carbonaceous BOD					
		Chloride					
		4-Chloro-n-cresol					
		Dichlorodifluoromethane		5A			
		p,p'-DDD					
		p,p'-DDE					

TABLE A-3 (Cont.)

Analytical Test Group					Petroleum Refinery[c]		
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	5[d]	4[e]	6[e]
		p,p'-DDT					
		3,3'-Dichlorobenzidine					
		Dibromomethane					
		Diethyl phthalate					
		Dimethyl phthalate					
		Dieldrin					
		Dissolved oxygen					
		1,4-dioxane					
		Endosulfan sulfate					
		Endrin aldehyde					
		Fecal coliforms		5A			
		Free cyanide					
		First stage oxygen demand (FSOD)					
		Fluoride		5A			
		Hydrogen sulfide					
		Heptachlor					
		Heptachlor epoxide					
		Iron		5A			
		Un-ionized ammonia					
		Isophorone					
		Manganese					
		MBAS					
		Nitrobenzene					
		2-Nitrophenol					
		Temperature		5A			
		Thermal load					
		TSS % removal					
		Vinyl bromide					
		BOD5		5A	2/W		
		1,1,1-Trichloroethane					
		Ethyl chloride					
		2-Chloroethylvinylether					
		Total dissolved solids					
		Bromide		5A			
		Chlorine, total residue		5A			
		Color		5A			
		Radioactivity		5A			
		Sulfate as SO_4		5A			
		Sulfite, sulfide		5A			
		Surfacants		5A			
		Barium		5A			
		Boron		5A			
		Magnesium		5A			
		Tin		5A			
		Titanium		5A			

TABLE A-4 COMPARISON OF ONTARIO, U.S. EPA, AND OHIO MONITORING REQUIREMENTS

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 7	11	10	9	8
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	3/W	W	2/W	2/W	2/W
2	Cyanide	Cyanide	3/Q	5A				2/W	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	5/W	W	2/W	2/W	D
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	3/W	W	2/W	2/W	2/W
4b		Total Kjeldahl nitrogen	3/Q	5A					
		Nitrate	3/Q	5A					
		Nitrite	3/Q	5A					
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q						
		Total organic carbon (TOC)	3/W	5A					
6	Total phosphorus	Total phosphorus	3/W	5A				2/W	M
7	Specific conductance	Specific conductance	3/Q						
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	3/W	W	2/W	2/W	2/W
		Volatile suspended solids (VSS)	D						
9	Total metals	Aluminum	3/Q	5A					
		Beryllium	3/Q	5A					
		Cadmium	3/Q	5A					
		Chromium	3/Q	5A	3/W	W	2/W	W	2/W
		Cobalt	3/Q	5A					
		Copper	3/Q	5A					
		Lead	3/Q	5A					
		Molybdenum	3/Q	5A	W				
		Nickel	3/Q	5A					
		Silver	3/Q	5A					
		Thallium	3/Q	5A					
		Vanadium	3/Q						

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 7 = Ashland Oil; 11 = Chevron; 10 = Standard Oil, Toledo; 9 = Standard Oil, Lima; 8 = Sun Refinery and Marketing.

(d) Analysis for organic pollutants is performed for one year, at which time Ohio EPA may propose effluent limitations for specific organic pollutants, continue, or modify the monitoring program as appropriate. Additionally, a reasonable attempt should be made to identify any substances not contained on this list but present in the extract through GC/MS.

(e) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-4 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]				
No.	Name				7	11	10	9	8
		Zinc	3/Q[e]	5A					
10	Hydrides	Antimony	3/Q	5A					
		Arsenic	3/Q	5A					
		Selenium	3/Q	5A					
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		W	W	2/W	W	2/W
12	Mercury	Mercury	3/Q	5A					
13	Total alkyl lead	Tetra-alkyl lead	3/Q						
		Tri-alkyl lead	3/Q						
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	W	W	2/W	2/W	2/W
15	Sulphide	Sulphide	3/W		W	W	2/W	2/W	2/W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A	Q	Q	Q	Q	Q
		1,1,2-Trichloroethane	3/Q	5A	Q	Q	Q	Q	Q
		1,1-Dichloroethane	3/Q	5A	Q	Q	Q	Q	Q
		1,1-Dichloroethylene	3/Q	5A	2/A	2/A	2/A	2/A	2/A
		1,2-Dichlorobenzene	3/Q		Q	Q	Q	Q	Q
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A	Q	Q	Q	Q	Q
		1,2-Dichloropropane	3/Q	5A	Q	Q	Q	Q	Q
		1,3-Dichlorobenzene	3/Q		Q	Q	Q	Q	Q
		1,4-Dichlorobenzene	3/Q		Q	Q	Q	Q	Q
		Bromoform	3/Q	5A	Q	Q	Q	Q	Q
		Bromomethane	3/Q	5A					
		Carbon tetrachloride	3/Q	5A	Q	Q	Q	Q	Q
		Chlorobenzene	3/Q	5A	Q	Q	Q	Q	Q
		Chloroform	3/Q	5A	Q	Q	Q	Q	Q
		Chloromethane	3/Q	5A	Q	Q	Q	Q	Q
		Cis-1,3-Dichloropropylene	3/Q	5A	2/A	2/A	2/A	2/A	2/A
		Dibromochloromethane	3/Q	5A	Q	Q	Q	Q	Q
		Dichlorobromomethane	3/Q	5A	Q	Q	Q	Q	Q
		Ethylene dibromide	3/Q						
		Methylene chloride	3/Q	5A	Q	Q	Q	Q	Q
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A	Q	Q	Q	Q	Q
		Trans-1,2-Dichloroethylene	3/Q	5A	2/A	2/A	2/A	2/A	2/A
		Trans-1,3-Dichloropropylene	3/Q		Q	Q	Q	Q	Q
		Trichloroethylene	3/Q	5A	Q	Q	Q	Q	Q
		Trichlorofluoromethane	3/Q	5A					
		Vinyl chloride (Chloroethylene)	3/Q	5A	Q	Q	Q	Q	Q

TABLE A-4 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 7	11	10	9	8
17	Volatiles, Non-Halogenated	Benzene	3/W	5A	Q	Q	Q	Q	Q
		Ethylbenzene	3/W	5A	Q	Q	Q	Q	Q
		Methyl ethyl ketone	3/Q						
		Styrene	3/Q						
		Toluene	3/W	5A	Q	Q	Q	Q	Q
		o-Xylene	3/W						
		m-Xylene and p-Xylene	3/W						
18	Volatiles, Water Soluble	Acrolein	3A	5A					
		Acrylonitrile	3A	5A				Q	Q
		1,3-Butadiene	3A						
19	Extractables, Base Neutral	Acenaphthene	3/Q		Q	Q	Q	Q	Q
		5-nitro Acenaphthene	3/Q						
		Acenaphthylene	3/Q		Q	Q	Q	Q	Q
		Anthracene	3/Q		Q	Q	Q	Q	Q
		Benz(a)anthracene	3/Q		Q	Q	Q	Q	Q
		Benzo(a)pyrene	3/Q		Q	Q	Q	Q	Q
		Benzo(b)fluoranthene	3/Q		Q	Q	Q	Q	Q
		Benzo(ghi)perylene	3/Q		Q	Q	Q	Q	Q
		Benzo(k)fluoranthene	3/Q		Q	Q	Q	Q	Q
		Camphene	3/Q						
		1-Chloronaphthalene	3/Q						
		2-Chloronaphthalene	3/Q		A	A	A	A	A
		Chrysene	3/Q		Q	Q	Q	Q	Q
		Dibenz(a,h)anthracene	3/Q		Q	Q	Q	Q	Q
		Fluoranthene	3/Q		Q	Q	Q	Q	Q
		Fluorene	3/Q		Q	Q	Q	Q	Q
		Indeno(1,2,3-cd)pyrene	3/Q		Q	Q	Q	Q	Q
		Indole	3/Q						
		1-Methylnaphthalene	3/Q						
		2-Methylnaphthalene	3/Q						
		Naphthalene	3/Q		Q	Q	Q	Q	Q
		Perylene	3/Q						
		Phenanthrene	3/Q		Q	Q	Q	Q	Q
		Pyrene	3/Q		Q	Q	Q	Q	Q
		Benzyl butyl phthalate	3A		A	A	A	A	A
		Bis(2-ethyhexyl) phthalate	3A		A	A	A	A	A
		Di-n-butyl phthalate	3A		A	A	A	A	A
		Di-n-octyl phthalate	3A		A	A	A	A	A
		4-Bromophenyl phenyl ether	3A		A	A	A	A	A
		4-Chlorophenyl phenyl ether	3A		A	A	A	A	A

TABLE A-4 (Cont.)

Analytical Test Group					Petroleum Refinery[c]				
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	7	11	10	9	8
		Bis(2-chloroisopropyl)ether	3A		A	A	A	A	A
		Bis(2-chloroethyl)ether	3A		A	A	A	A	A
		Diphenyl ether	3A						
		2,4-Dinitrotoluene	3A		A	A	A	A	A
		2,6-Dinitrotoluene	3A		A	A	A	A	A
		Bis(2-chloroethoxy)methane	3A		A	A	A	A	A
		Diphenylamine	3A						
		N-Nitrosodiphenylamine	3A		A	A	A	A	A
		N-Nitrosodi-n-propylamine	3A		A	A	A	A	A
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q						
		2,3,4,6-Tetrachlorophenol	3/Q						
		2,3,5,6-Tetrachlorophenol	3/Q						
		2,3,4-Trichlorophenol	3/Q						
		2,3,5-Trichlorophenol	3/Q						
		2,4,5-Trichlorophenol	3/Q						
		2,4,6-Trichlorophenol	3/Q		A	A	A	A	A
		2,4-Dimethyl phenol	3/Q		A	A	A	A	A
		2,4-Dinitrophenol	3/Q		A	A	A	A	A
		2,4-Dichlorophenol	3/Q		A	A	A	A	A
		2,6-Dichlorophenol	3/Q						
		4,6-Dinitro-o-cresol	3/Q		A	A	A	A	A
		2-Chlorophenol	3/Q		A	A	A	A	A
		4-Chloro-3-methylphenol	3/Q						
		4-Nitrophenol	3/Q		A	A	A	A	A
		m-Cresol	3/Q						
		o-Cresol	3/Q						
		p-Cresol	3/Q						
		Pentachlorophenol	3/Q		A	A	A	A	A
		Phenol	3/Q		A	A	A	A	A
21	Extractables, Phenoxy Acid Herbicides								
22	Extractables, Organochlorine Pesticides								
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A						
		1,2,3,5-Tetrachlorobenzene	3A						
		1,2,4,5-Tetrachlorobenzene	3A						
		1,2,3-Trichlorobenzene	3A						

TABLE A-4 (Cont.)

Analytical Test Group					Petroleum Refinery$^{(c)}$				
No.	Name	Characterization Parameters	Ontario$^{(a)}$	U.S. EPA$^{(b)}$	7	11	10	9	8
		1,2,4-Trichlorobenzene	3A		A	A	A	A	A
		2,4,5-Trichlorotoluene	3A						
		Hexachlorobenzene	3A		A	A	A	A	A
		Hexachlorobutadiene	3A		A	A	A	A	A
		Hexachlorocyclopentadiene	3A		A	A	A	A	A
		Hexachloroethane	3A		A	A	A	A	A
		Octachlorostyrene	3A						
		Pentachlorobenzene	3A						
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans								
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A						
		Octachlorodibenzo-p-dioxin	3A						
		Octachlorodibenzofuran	3A						
		Total heptachlorinated dibenzo-p-dioxins	3A						
		Total hexachlorinated dibenzofurans	3A						
		Total hexachlorinated dibenzo-p-dioxins	3A						
		Total heptachlorinated dibenzofurans	3A						
		Total pentachlorinated dibenzo-p-dioxins	3A						
		Total pentachlorinated dibenzofurans	3A						
		Total tetrachlorinated dibenzo-p-dioxins	3A						
		Total tetrachlorinated dibenzofurans	3A						
25	Solvent Extractables	Oil and grease	3/W	5A	3/W	W	2/W	2/W	2/W
26	Fatty and Resin Acids								
27	PCBs	PCBs (Aroclors)	3A						
	Additional Requirements	Toxicity testing	M						
		Flow	C	5A	5/W	D	D	D	D
	Additional State or U.S. EPA Requirements								
		Acridine							
		Aldrin							
		Benzidine							
		Bis chloromethyl ether							
		BOD5 % removal		5A	A	A	A	A	
		Carbonaceous BOD							
		Chloride							
		4-Chloro-n-cresol							
		Dichlorodifluoromethane							
		p,p'-DDD		5A	A	A	A	A	
		p,p'-DDE							

TABLE A-4 (Cont.)

Analytical Test Group					Petroleum Refinery[c]				
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	7	11	10	9	8
		p,p'-DDT							
		3,3'-Dichlorobenzidine							
		Diethyl phthalate			A	A	A	A	A
		Dimethyl phthalate			A	A	A	A	A
		Dieldrin							
		Dissolved oxygen						2/W	D
		1,4-dioxane							
		Endosulfan sulfate							
		Endrin aldehyde							
		Fecal coliforms		5A					
		Free cyanide						W	
		First stage oxygen demand (FSOD)							
		Fluoride		5A					
		Hydrogen sulfide							
		Heptachlor							
		Heptachlor epoxide							
		Iron		5A					
		Un-ionized ammonia							
		Isophorone			A	A	A	A	A
		Manganese		5A					
		MBAS							
		Nitrobenzene			A	A	A	A	A
		2-Nitrophenol			A	A	A	A	A
		Temperature		5A	5/W	D		D	D
		Thermal load							
		TSS % removal							
		Vinyl bromide							
		BOD5		5A	W	W	2/W	2/W	2/W
		1,1,1-Trichloroethane			Q	Q	Q	Q	Q
		Dibromomethane			Q	Q	Q	Q	Q
		Ethyl chloride		5A	Q	Q	Q	Q	Q
		2-Chloroethylvinylether		5A	Q	Q	Q	Q	Q
		Total Dissolved Solids			W				
		Bromide		5A	A	A	A	A	
		Chlorine, total residue		5A					
		Color		5A					
		Radioactivity		5A					
		Sulfate as SO_4		5A					
		Sulfite, sulfide		5A					
		Surfactants		5A					
		Barium		5A					
		Boron		5A					
		Magnesium		5A					
		Tin		5A					
		Titanium		5A					

TABLE A-5 COMPARISON OF ONTARIO, U.S. EPA, AND ILLINOIS MONITORING REQUIREMENTS

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 17	16[(d)]	15	14[(e)]
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	2/W		2/W	2/W
2	Cyanide	Cyanide	3/Q	5A	2/W		2/W	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	(f)	I	2/W	2/W
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	2/W		2/W	2/W
4b		Total kjeldahl nitrogen	3/Q	5A				
		Nitrate	3/Q	5A				
		Nitrite	3/Q	5A				
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q					
		Total organic carbon (TOC)	3/W	5A				
6	Total phosphorus	Total phosphorus	3/W	5A				2/W
7	Specific conductance	Specific conductance	3/Q					
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	2/W	I	2/W	2/W
		Volatile suspended solids (VSS)	D					
9	Total metals	Aluminum	3/Q	5A				
		Beryllium	3/Q	5A				
		Cadmium	3/Q	5A				
		Chromium	3/Q[(g)]	5A	2/W	I	2/W	2/W
		Cobalt	3/Q	5A				
		Copper	3/Q	5A				
		Lead	3/Q	5A				
		Molybdenum	3/Q	5A		I		
		Nickel	3/Q	5A				

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 17 = Union Oil Co.; 16 = Texaco Refining and Marketing; 15 = Mobil Oil Company; 14= Shell Oil Company; 12 = Marathon Petroleum Co.; 13 = Clark Oil and Refining Corporation; 18 = Texaco, Inc.

(d) Permit lists sample frequency as "once per batch." This refinery is now closed.

(e) Organic contaminant monitoring requirements may be deleted if, after one year, concentrations are judged "not to be of toxic significance to human health or indigenous aquatic organisms."

(f) No frequency given.

(g) If used in process analyze 3/W, otherwise 3Q.

TABLE A-5 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]			
No.	Name				17	16[d]	15	14[e]
		Silver	3/Q	5A				
		Thallium	3/Q	5A				
		Vanadium	3/Q					
		Zinc	3/Q[g]	5A				
10	Hydrides	Antimony	3/Q	5A				
		Arsenic	3/Q	5A				
		Selenium	3/Q	5A				
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		2/W	I	2/W	2/W
12	Mercury	Mercury	3/Q	5A				
13	Total alkyl lead	Tetra-alkyl lead	3/Q					
		Tri-alkyl lead	3/Q					
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	2/W	I	2/W	2/W
15	Sulphide	Sulphide	3/W		2/W		2/W	2/W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A		2/A		
		1,1,2-Trichloroethane	3/Q	5A		2/A		
		1,1-Dichloroethane	3/Q	5A		2/A		
		1,1-Dichloroethylene	3/Q	5A		2/A		
		1,2-Dichlorobenzene	3/Q			2/A		
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A		2/A		
		1,2-Dichloropropane	3/Q	5A		2/A		
		1,3-Dichlorobenzene	3/Q			2/A		
		1,4-Dichlorobenzene	3/Q			2/A		
		Bromoform	3/Q	5A		2/A		
		Bromomethane	3/Q	5A		2/A		
		Carbon tetrachloride	3/Q	5A		2/A		
		Chlorobenzene	3/Q	5A		2/A		
		Chloroform	3/Q	5A		2/A		
		Chloromethane	3/Q	5A		2/A		
		Cis-1,3-Dichloropropylene	3/Q	5A		2/A		
		Dibromochloromethane	3/Q	5A		2/A		
		Dichlorobromomethane	3/Q	5A		2/A		
		Ethylene dibromide	3/Q					
		Methylene chloride	3/Q	5A		2/A		
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A		2/A		
		Trans-1,2-Dichloroethylene	3/Q	5A		2/A		
		Trans-1,3-Dichloropropylene	3/Q			2/A		
		Trichloroethylene	3/Q	5A		2/A		

TABLE A-5 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]			
No.	Name				17	16[(d)]	15	14[(e)]
		Trichlorofluoromethane	3/Q	5A				
		Vinyl chloride (Chloroethylene)	3/Q	5A		2/A		
17	Volatiles, Non-Halogenated	Benzene	3/W	5A		2/A		2/A
		Ethylbenzene	3/W	5A		2/A		2/A
		Methyl ethyl ketone	3/Q					
		Styrene	3/Q					
		Toluene	3/W	5A		2/A		2/A
		o-Xylene	3/W					
		m-Xylene and p-Xylene	3/W					
18	Volatiles, Water Soluble	Acrolein	3A	5A				
		Acrylonitrile	3A	5A				
		1,3-Butadiene	3A					
19	Extractables, Base Neutral	Acenaphthene	3/Q			2/A		2/A
		5-nitro Acenaphthene	3/Q					
		Acenaphthylene	3/Q			2/A		2/A
		Anthracene	3/Q			2/A		2/A
		Benz(a)anthracene	3/Q			2/A		2/A
		Benzo(a)pyrene	3/Q			2/A		2/A
		Benzo(b)fluoranthene	3/Q			2/A		2/A
		Benzo(ghi)perylene	3/Q			2/A		2/A
		Benzo(k)fluoranthene	3/Q			2/A		2/A
		Camphene	3/Q					
		1-Chloronaphthalene	3/Q					
		2-Chloronaphthalene	3/Q			2/A		2/A
		Chrysene	3/Q			2/A		2/A
		Dibenz(a,h)anthracene	3/Q			2/A		2/A
		Fluoranthene	3/Q			2/A		2/A
		Fluorene	3/Q			2/A		2/A
		Indeno(1,2,3-cd)pyrene	3/Q			2/A		2/A
		Indole	3/Q					
		1-Methylnaphthalene	3/Q					
		2-Methylnaphthalene	3/Q					
		Naphthalene	3/Q			2/A		2/A
		Perylene	3/Q					
		Phenanthrene	3/Q			2/A		2/A
		Pyrene	3/Q			2/A		2/A
		Benzyl butyl phthalate	3A			2/A		2/A
		Bis(2-ethyhexyl) phthalate	3A			2/A		2/A
		Di-n-butyl phthalate	3A			2/A		2/A
		Di-n-octyl phthalate	3A			2/A		2/A

TABLE A-5 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 17	Petroleum Refinery[(c)] 16[(d)]	Petroleum Refinery[(c)] 15	Petroleum Refinery[(c)] 14[(e)]
		4-Bromophenyl phenyl ether	3A			2/A		2/A
		4-Chlorophenyl phenyl ether	3A			2/A		2/A
		Bis(2-chloroisopropyl)ether	3A			2/A		2/A
		Bis(2-chloroethyl)ether	3A			2/A		2/A
		Diphenyl ether	3A					
		2,4-Dinitrotoluene	3A			2/A		2/A
		2,6-Dinitrotoluene	3A			2/A		2/A
		Bis(2-chloroethoxy)methane	3A			2/A		2/A
		Diphenylamine	3A					
		N-Nitrosodiphenylamine	3A					
		N-Nitrosodi-n-propylamine	3A			2/A		2/A
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q					
		2,3,4,6-Tetrachlorophenol	3/Q					
		2,3,5,6-Tetrachlorophenol	3/Q					
		2,3,4-Trichlorophenol	3/Q					
		2,3,5-Trichlorophenol	3/Q					
		2,4,5-Trichlorophenol	3/Q					
		2,4,6-Trichlorophenol	3/Q			2/A		2/A
		2,4-Dimethyl phenol	3/Q			2/A		2/A
		2,4-Dinitrophenol	3/Q			2/A		2/A
		2,4-Dichlorophenol	3/Q			2/A		2/A
		2,6-Dichlorophenol	3/Q					
		4,6-Dinitro-o-cresol	3/Q			2/A		2/A
		2-Chlorophenol	3/Q			2/A		2/A
		4-Chloro-3-methylphenol	3/Q					
		4-Nitrophenol	3/Q			2/A		2/A
		m-Cresol	3/Q					
		o-Cresol	3/Q					
		p-Cresol	3/Q					
		Pentachlorophenol	3/Q			2/A		2/A
		Phenol	3/Q			2/A		2/A
21	Extractables, Phenoxy Acid Herbicides							
22	Extractables, Organochlorine Pesticides							
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A			2/A		2/A
		1,2,3,5-Tetrachlorobenzene	3A					

TABLE A-5 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario$^{(a)}$	U.S. EPA$^{(b)}$	Petroleum Refinery$^{(c)}$ 17	16$^{(d)}$	15	14$^{(e)}$
		1,2,4,5-Tetrachlorobenzene	3A					
		1,2,3-Trichlorobenzene	3A					
		1,2,4-Trichlorobenzene	3A					
		2,4,5-Trichlorotoluene	3A					
		Hexachlorobenzene	3A			2/A		2/A
		Hexachlorobutadiene	3A			2/A		2/A
		Hexachlorocyclopentadiene	3A					
		Hexachloroethane	3A			2/A		2/A
		Octachlorostyrene	3A					
		Pentachlorobenzene	3A					
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A					
		Octachlorodibenzo-p-dioxin	3A					
		Octachlorodibenzofuran	3A					
		Total heptachlorinated dibenzo-p-dioxins	3A					
		Total hexachlorinated dibenzofurans	3A					
		Total hexachlorinated dibenzo-p-dioxins	3A					
		Total heptachlorinated dibenzofurans	3A					
		Total pentachlorinated dibenzo-p-dioxins	3A					
		Total pentachlorinated dibenzofurans	3A					
		Total tetrachlorinated dibenzo-p-dioxins	3A					
		Total tetrachlorinated dibenzofurans	3A					
25	Solvent Extractables	Oil and grease	3/W		2/W	I	W	W
26	Fatty and Resin Acids							
27	PCBs	PCBs (Aroclors)	3A			2/A		2/A
	Additional Requirements	Toxicity testing	M					
		Flow	C	5A	D		D	D
	Additional State or U.S. EPA Requirements	Acridine						
		Aldrin				2/A		2/A
		Benzidine						
		Bis chloromethyl ether		5A				
		BOD5 % removal						
		Carbonaceous BOD				I		
		Chloride						
		4-Chloro-n-cresol				2/A		2/A

TABLE A-5 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]			
No.	Name				17	16[(d)]	15	14[(e)]
		Dichlorodifluoromethane		5A				
		p,p'-DDD				2/A		2/A
		p,p'-DDE				2/A		2/A
		p,p'-DDT				2/A		2/A
		3,3'-Dichlorobenzidine				2/A		2/A
		Dibromomethane						
		Diethyl phthalate				2/A		2/A
		Dimethyl phthalate				2/A		2/A
		Dieldrin				2/A		2/A
		Dissolved oxygen						
		1,4-Dioxane						
		Endosulfan sulfate				2/A		
		Endrin aldehyde				2/A		
		Fecal coliforms		5A				
		Free cyanide						
		First stage oxygen demand (FSOD)						
		Fluoride		5A	2/W			
		Hydrogen sulfide						
		Heptachlor				2/A		2/A
		Heptachlor epoxide				2/A		2/A
		Iron		5A				
		Un-ionized ammonia						
		Isophorone				2/A		2/A
		Manganese		5A				
		MBAS						
		Nitrobenzene				2/A		2/A
		2-Nitrophenol				2/A		2/A
		Temperature		5A				2/W
		Thermal load						
		TSS % removal						
		Vinyl bromide						
		BOD5		5A	2/W		2/W	2/W
		1,1,1-Trichloroethane				2/W		
		Ethyl chloride		5A		2/A		
		2-Chloroethylvinylether				2/A		2/A
		Total Dissolved Solids						

TABLE A-5 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]			
No.	Name				17	16[d]	15	14[e]
		Bromide		5A				
		Chlorine, total residue		5A				
		Color		5A				
		Radioactivity		5A				
		Sulfate as SO_4		5A				
		Sulfite, sulfide		5A				
		Surfactants		5A				
		Barium		5A				
		Boron		5A				
		Magnesium		5A				
		Tin		5A				
		Titanium		5A				
				5A				

TABLE A-5 COMPARISON OF ONTARIO, U.S. EPA, AND ILLINOIS MONITORING REQUIREMENTS (Extended)

Analytical Test Group					Petroleum Refinery[c]		
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	12[e]	13	18
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	2/W	2/W	2/W
2	Cyanide	Cyanide	3/Q	5A		2/W	
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	2/W	2/W	2/W
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	2/W	2/W	2/W
		Total kjeldahl nitrogen	3/Q	5A			
4b		Nitrate	3/Q	5A			
		Nitrite	3/Q	5A			
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q				
		Total organic carbon (TOC)	3/W	5A			
6	Total phosphorus	Total phosphorus	3/W	5A			
7	Specific conductance	Specific conductance	3/Q				
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	2/W	2/W	2/W
		Volatile suspended solids (VSS)	D				
9	Total metals	Aluminum	3/Q	5A			
		Beryllium	3/Q	5A			
		Cadmium	3/Q	5A			
		Chromium	3/Q[g]	5A	2/W	2/W	2/W
		Cobalt	3/Q	5A			
		Copper	3/Q	5A			
		Lead	3/Q	5A			
		Molybdenum	3/Q	5A			
		Nickel	3/Q	5A			
		Silver	3/Q	5A			
		Thallium	3/Q	5A			
		Vanadium	3/Q				
		Zinc	3/Q[g]	5A			
10	Hydrides	Antimony	3/Q	5A			
		Arsenic	3/Q	5A			
		Selenium	3/Q	5A			

TABLE A-5 EXTENDED (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]		
No.	Name				12[(e)]	13	18
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		2/W	2/W	2/W
12	Mercury	Mercury	3/Q	5A			
13	Total alkyl lead	Tetra-alkyl lead	3/Q				
		Tri-alkyl lead	3/Q				
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	2/W	2/W	2/W
15	Sulphide	Sulphide	3/W		2/W	2/W	2/W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A			
		1,1,2-Trichloroethane	3/Q	5A			
		1,1-Dichloroethane	3/Q	5A			
		1,1-Dichloroethylene	3/Q	5A			
		1,2-Dichlorobenzene	3/Q				
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A			
		1,2-Dichloropropane	3/Q	5A			
		1,3-Dichlorobenzene	3/Q				
		1,4-Dichlorobenzene	3/Q				
		Bromoform	3/Q	5A			
		Bromomethane	3/Q	5A			
		Carbon tetrachloride	3/Q	5A			
		Chlorobenzene	3/Q	5A			
		Chloroform	3/Q	5A			
		Chloromethane	3/Q	5A			
		Cis-1,3-Dichloropropylene	3/Q	5A			
		Dibromochloromethane	3/Q	5A			
		Dichlorobromomethane	3/Q	5A			
		Ethylene dibromide	3/Q				
		Methylene chloride	3/Q	5A			
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A			
		Trans-1,2-Dichloroethylene	3/Q	5A			
		Trans-1,3-Dichloropropylene	3/Q				
		Trichloroethylene	3/Q	5A			
		Trichlorofluoromethane	3/Q	5A			
		Vinyl chloride (Chloroethylene)	3/Q	5A			
17	Volatiles, Non-Halogenated	Benzene	3/W	5A	2/A		
		Ethylbenzene	3/W	5A	2/A		
		Methyl ethyl ketone	3/Q				
		Styrene	3/Q				
		Toluene	3/W	5A	2/A		

TABLE A-5 EXTENDED (Cont.)

Analytical Test Group		Characterization Parameters	Ontario(a)	U.S. EPA(b)	Petroleum Refinery(c)		
No.	Name				12(e)	13	18
		o-Xylene	3/W				
		m-Xylene and p-Xylene	3/W				
18	Volatiles, Water Soluble	Acrolein	3A	5A			
		Acrylonitrile	3A	5A			
		1,3-Butadiene	3A				
19	Extractables, Base Neutral	Acenaphthene	3/Q			2/A	
		5-nitro Acenaphthene	3/Q				
		Acenaphthylene	3/Q			2/A	
		Anthracene	3/Q			2/A	
		Benz(a)anthracene	3/Q			2/A	
		Benzo(a)pyrene	3/Q			2/A	
		Benzo(b)fluoranthene	3/Q			2/A	
		Benzo(ghi)perylene	3/Q			2/A	
		Benzo(k)fluoranthene	3/Q			2/A	
		Camphene	3/Q				
		1-Chloronaphthalene	3/Q				
		2-Chloronaphthalene	3/Q				
		Chrysene	3/Q			2/A	
		Dibenz(a,h)anthracene	3/Q			2/A	
		Fluoranthene	3/Q			2/A	
		Fluorene	3/Q			2/A	
		Indeno(1,2,3-cd)pyrene	3/Q			2/A	
		Indole	3/Q				
		1-Methylnaphthalene	3/Q				
		2-Methylnaphthalene	3/Q				
		Naphthalene	3/Q			2/A	
		Perylene	3/Q				
		Phenanthrene	3/Q			2/A	
		Pyrene	3/Q			2/A	
		Benzyl butyl phthalate	3A				
		Bis(2-ethyhexyl) phthalate	3A				
		Di-n-butyl phthalate	3A				
		Di-n-octyl phthalate	3A				
		4-Bromophenyl phenyl ether	3A				
		4-Chlorophenyl phenyl ether	3A				
		Bis(2-chloroisopropyl)ether	3A				
		Bis(2-chloroethyl)ether	3A				
		Diphenyl ether	3A				
		2,4-Dinitrotoluene	3A				
		2,6-Dinitrotoluene	3A				

TABLE A-5 EXTENDED (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 12[(e)]	Petroleum Refinery[(c)] 13	Petroleum Refinery[(c)] 18
		Bis(2-chloroethoxy)methane	3A				
		Diphenylamine	3A				
		N-Nitrosodiphenylamine	3A				
		N-Nitrosodi-n-propylamine	3A				
20	Extractables, Acid (Phenolics)						
		2,3,4,5-Tetrachlorophenol	3/Q				
		2,3,4,6-Tetrachlorophenol	3/Q				
		2,3,5,6-Tetrachlorophenol	3/Q				
		2,3,4-Trichlorophenol	3/Q				
		2,3,5-Trichlorophenol	3/Q				
		2,4,5-Trichlorophenol	3/Q				
		2,4,6-Trichlorophenol	3/Q				
		2,4-Dimethyl phenol	3/Q				
		2,4-Dinitrophenol	3/Q				
		2,4-Dichlorophenol	3/Q				
		2,6-Dichlorophenol	3/Q				
		4,6-Dinitro-o-cresol	3/Q				
		2-Chlorophenol	3/Q				
		4-Chloro-3-methylphenol	3/Q				
		4-Nitrophenol	3/Q				
		m-Cresol	3/Q				
		o-Cresol	3/Q				
		p-Cresol	3/Q				
		Pentachlorophenol	3/Q				
		Phenol	3/Q				
21	Extractables, Phenoxy Acid Herbicides						
22	Extractables, Organochlorine Pesticides						
23	Extractables, Neutral Chlorinated						
		1,2,3,4-Tetrachlorobenzene	3A				
		1,2,3,5-Tetrachlorobenzene	3A				
		1,2,4,5-Tetrachlorobenzene	3A				
		1,2,3-Trichlorobenzene	3A				
		1,2,4-Trichlorobenzene	3A				
		2,4,5-Trichlorotoluene	3A				
		Hexachlorobenzene	3A				
		Hexachlorobutadiene	3A				
		Hexachlorocyclopentadiene	3A				
		Hexachloroethane	3A				

TABLE A-5 EXTENDED (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 12[(e)]	Petroleum Refinery[(c)] 13	Petroleum Refinery[(c)] 18
		Octachlorostyrene	3A				
		Pentachlorobenzene	3A				
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A				
		Octachlorodibenzo-p-dioxin	3A				
		Octachlorodibenzofuran	3A				
		Total heptachlorinated dibenzo-p-dioxins	3A				
		Total hexachlorinated dibenzofurans	3A				
		Total hexachlorinated dibenzo-p-dioxins	3A				
		Total heptachlorinated dibenzofurans	3A				
		Total pentachlorinated dibenzo-p-dioxins	3A				
		Total pentachlorinated dibenzofurans	3A				
		Total tetrachlorinated dibenzo-p-dioxins	3A				
		Total tetrachlorinated dibenzofurans	3A				
25	Solvent Extractables	Oil and grease	3/W		W	2/W	W
26	Fatty and Resin Acids						
27	PCBs	PCBs (Aroclors)	3A				
	Additional Requirements	Toxicity testing	M				
		Flow	C	5A	D	D	D
	Additional State or U.S. EPA Requirements	Acridine					
		Aldrin					
		Benzidine					
		Bis chloromethyl ether		5A			
		BOD5 % removal					
		Carbonaceous BOD					
		Chloride					
		4-Chloro-n-cresol					
		Dichlorodifluoromethane		5A			
		p,p'-DDD					
		p,p'-DDE					
		p,p'-DDT					
		3,3'-Dichlorobenzidine					
		Dibromomethane					
		Diethyl phthalate					
		Dimethyl phthalate					

TABLE A-5 EXTENDED (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]		
No.	Name				12[e]	13	18
		Dieldrin					
		Dissolved oxygen					
		1,4-Dioxane					
		Endosulfan sulfate					
		Endrin aldehyde					
		Fecal coliforms		5A			
		Free cyanide					
		First stage oxygen demand (FSOD)					
		Fluoride		5A			
		Hydrogen sulfide					
		Heptachlor					
		Heptachlor epoxide					
		Iron		5A			
		Un-ionized ammonia			2/W		
		Isophorone					
		Manganese		5A			
		MBAS					
		Nitrobenzene					
		2-Nitrophenol					
		Temperature		5A	2/W		
		Thermal load					
		TSS % removal					
		Vinyl bromide					
		BOD5		5A	2/W	2/W	2/W
		1,1,1-Trichloroethane					
		Ethyl chloride		5A			
		2-Chloroethylvinylether		5A			
		Total dissolved solids			2/W		
		Bromide		5A			
		Chlorine, total residue		5A			
		Color		5A			
		Radioactivity		5A			
		Sulfate as SO_4		5A			
		Sulfite, sulfide		5A			
		Surfactants		5A			
		Barium		5A			
		Boron		5A			
		Magnesium		5A			
		Tin		5A			
		Titanium		5A			

TABLE A-6 COMPARISON OF ONTARIO, U.S. EPA, AND INDIANA MONITORING REQUIREMENTS

Analytical Test Group		Characterization Parameters	Ontario(a)	U.S. EPA(b)	Petroleum Refinery(c)		
No.	Name				21	20	19
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	3/W	W	W
2	Cyanide	Cyanide	3/Q	5A			
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	3/W	C	W
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	5/W	W	W
		Total Kjeldahl nitrogen	3/Q	5A			
4b		Nitrate	3/Q	5A			
		Nitrite	3/Q	5A			
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q				
		Total organic carbon (TOC)	3/W	5A			M
6	Total phosphorus	Total phosphorus	3/W	5A			
7	Specific conductance	Specific conductance	3/Q				
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	5/W	2/W	W
		Volatile suspended solids (VSS)	D				
9	Total metals	Aluminum	3/Q	5A			
		Beryllium	3/Q	5A			
		Cadmium	3/Q	5A			
		Chromium	3/Q(d)	5A	W	W	4/Y
		Cobalt	3/Q	5A			
		Copper	3/Q	5A			
		Lead	3/Q	5A			
		Molybdenum	3/Q	5A			
		Nickel	3/Q	5A			
		Silver	3/Q	5A			
		Thallium	3/Q	5A			
		Vanadium	3/Q				

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 21 = Amoco Oil Company; 20 = Indiana Farm Bureau Cooperative Association; 19 = Laketon Refining Corp.

(d) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-6 (Cont.)

Analytical Test Group No.	 Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c] 21	 20	 19
		Zinc	3/Q[d]	5A			
10	Hydrides	Antimony	3/Q	5A			
		Arsenic	3/Q	5A			
		Selenium	3/Q	5A			M
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		W	W	4/Y
12	Mercury	Mercury	3/Q	5A			
13	Total alkyl lead	Tetra-alkyl lead	3/Q				
		Tri-alkyl lead	3/Q				
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	3/W	W	W
15	Sulphide	Sulphide	3/W		W	W	W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A			
		1,1,2-Trichloroethane	3/Q	5A			
		1,1-Dichloroethane	3/Q	5A			
		1,1-Dichloroethylene	3/Q	5A			
		1,2-Dichlorobenzene	3/Q				
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A			
		1,2-Dichloropropane	3/Q	5A			
		1,3-Dichlorobenzene	3/Q				
		1,4-Dichlorobenzene	3/Q				
		Bromoform	3/Q	5A			
		Bromomethane	3/Q	5A			
		Carbon tetrachloride	3/Q	5A			
		Chlorobenzene	3/Q	5A			
		Chloroform	3/Q	5A		W	
		Chloromethane	3/Q	5A			
		Cis-1,3-Dichloropropylene	3/Q	5A			
		Dibromochloromethane	3/Q	5A			
		Dichlorobromomethane	3/Q	5A			
		Ethylene dibromide	3/Q				
		Methylene chloride	3/Q	5A			
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A			
		Trans-1,2-Dichloroethylene	3/Q	5A			
		Trans-1,3-Dichloropropylene	3/Q				
		Trichloroethylene	3/Q	5A			
		Trichlorofluoromethane	3/Q	5A			
		Vinyl chloride (Chloroethylene)	3/Q	5A			

TABLE A-6 (Cont.)

Analytical Test Group No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c] 21	20	19
17	Volatiles, Non-Halogenated	Benzene	3/W	5A			
		Ethylbenzene	3/W	5A			
		Methyl ethyl ketone	3/Q				
		Styrene	3/Q				
		Toluene	3/W	5A			
		o-Xylene	3/W				
		m-Xylene and p-Xylene	3/W				
18	Volatiles, Water Soluble	Acrolein	3A	5A			
		Acrylonitrile	3A	5A			
		1,3-Butadiene	3A				
19	Extractables, Base Neutral	Acenaphthene	3/Q				
		5-nitro Acenaphthene	3/Q				
		Acenaphthylene	3/Q				
		Anthracene	3/Q				
		Benz(a)anthracene	3/Q				
		Benzo(a)pyrene	3/Q				
		Benzo(b)fluoranthene	3/Q				
		Benzo(ghi)perylene	3/Q				
		Benzo(k)fluoranthene	3/Q				
		Camphene	3/Q				
		1-Chloronaphthalene	3/Q				
		2-Chloronaphthalene	3/Q				
		Chrysene	3/Q				
		Dibenz(a,h)anthracene	3/Q				
		Fluoranthene	3/Q				
		Fluorene	3/Q				
		Indeno(1,2,3-cd)pyrene	3/Q				
		Indole	3/Q				
		1-Methylnaphthalene	3/Q				
		2-Methylnaphthalene	3/Q				
		Naphthalene	3/Q				
		Perylene	3/Q				
		Phenanthrene	3/Q				
		Pyrene	3/Q				
		Benzyl butyl phthalate	3A				
		Bis(2-ethyhexyl) phthalate	3A				
		Di-n-butyl phthalate	3A				
		Di-n-octyl phthalate	3A				
		4-Bromophenyl phenyl ether	3A				
		4-Chlorophenyl phenyl ether	3A				

TABLE A-6 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario$^{(a)}$	U.S. EPA$^{(b)}$	Petroleum Refinery$^{(c)}$		
No.	Name				21	20	19
		Bis(2-chloroisopropyl)ether	3A				
		Bis(2-chloroethyl)ether	3A				
		Diphenyl ether	3A				
		2,4-Dinitrotoluene	3A				
		2,6-Dinitrotoluene	3A				
		Bis(2-chloroethoxy)methane	3A				
		Diphenylamine	3A				
		N-Nitrosodiphenylamine	3A				
		N-Nitrosodi-n-propylamine	3A				
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q				
		2,3,4,6-Tetrachlorophenol	3/Q				
		2,3,5,6-Tetrachlorophenol	3/Q				
		2,3,4-Trichlorophenol	3/Q				
		2,3,5-Trichlorophenol	3/Q				
		2,4,5-Trichlorophenol	3/Q				
		2,4,6-Trichlorophenol	3/Q				
		2,4-Dimethyl phenol	3/Q				
		2,4-Dinitrophenol	3/Q				
		2,4-Dichlorophenol	3/Q				
		2,6-Dichlorophenol	3/Q				
		4,6-Dinitro-o-cresol	3/Q				
		2-Chlorophenol	3/Q				
		4-Chloro-3-methylphenol	3/Q				
		4-Nitrophenol	3/Q				
		m-Cresol	3/Q				
		o-Cresol	3/Q				
		p-Cresol	3/Q				
		Pentachlorophenol	3/Q				
		Phenol	3/Q				
21	Extractables, Phenoxy Acid Herbicides						
22	Extractables, Organochlorine Pesticides						
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A				
		1,2,3,5-Tetrachlorobenzene	3A				
		1,2,4,5-Tetrachlorobenzene	3A				
		1,2,3-Trichlorobenzene	3A				

TABLE A-6 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]		
No.	Name				21	20	19
		1,2,4-Trichlorobenzene	3A				
		2,4,5-Trichlorotoluene	3A				
		Hexachlorobenzene	3A				
		Hexachlorobutadiene	3A				
		Hexachlorocyclopentadiene	3A				
		Hexachloroethane	3A				
		Octachlorostyrene	3A				
		Pentachlorobenzene	3A				
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A				
		Octachlorodibenzo-p-dioxin	3A				
		Octachlorodibenzofuran	3A				
		Total heptachlorinated dibenzo-p-dioxins	3A				
		Total hexachlorinated dibenzofurans	3A				
		Total hexachlorinated dibenzo-p-dioxins	3A				
		Total heptachlorinated dibenzofurans	3A				
		Total pentachlorinated dibenzo-p-dioxins	3A				
		Total pentachlorinated dibenzofurans	3A				
		Total tetrachlorinated dibenzo-p-dioxins	3A				
		Total tetrachlorinated dibenzofurans					
25	Solvent Extractables	Oil and grease	3/W	5A	5/W	W	W
26	Fatty and Resin Acids						
27	PCBs	PCBs (Aroclors)	3A				
	Additional Requirements	Toxicity testing	M				
		Flow	C	5A	C	C	C
	Additional State or U.S. EPA Requirements	Acridine					
		Aldrin					
		Benzidine					
		Bis chloromethyl ether		5A			
		BOD5 % removal					
		Carbonaceous BOD					
		Chloride					
		4-Chloro-n-cresol					
		Dichlorodifluoromethane		5A			
		p,p'-DDD					
		p,p'-DDE					

TABLE A-6 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]		
No.	Name				21	20	19
		p,p'-DDT					
		3,3'-Dichlorobenzidine					
		Dibromomethane					
		Diethyl phthalate					
		Dimethyl phthalate					
		Dieldrin					
		Dissolved oxygen					
		1,4-dioxane					
		Endosulfan sulfate					
		Endrin aldehyde					
		Fecal coliforms		5A			
		Free cyanide					
		First stage oxygen demand (FSOD)					
		Fluoride		5A			
		Hydrogen sulfide					
		Heptachlor					
		Heptachlor epoxide					
		Iron					
		Un-ionized ammonia		5A			
		Isophorone					
		Manganese		5A			
		MBAS					
		Nitrobenzene					
		2-Nitrophenol					
		Temperature		5A			M
		Thermal load					
		TSS % removal					
		Vinyl bromide					
		BOD5		5A	5/W	W	W
		1,1,1-Trichloroethylene					
		Ethylchloride					
		2-Chloroethylvinylether					
		Total dissolved solids					
		Bromide		5A			
		Chlorine, total residue		5A			
		Color		5A			
		Radioactivity		5A			
		Sulfate as SO_4		5A			
		Sulfite, sulfide		5A			
		Surfactants		5A			
		Barium		5A			
		Boron		5A			
		Magnesium		5A			
		Tin		5A			
		Titanium		5A			

TABLE A-7 COMPARISON OF ONTARIO, U.S. EPA, AND PENNSYLVANIA MONITORING REQUIREMENTS

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S EPA[(b)]	Petroleum Refinery[(c)]						
No.	Name				34	33	32	31	30	29	28
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	W		2/W	2/W	2/W	W	
2	Cyanide	Cyanide	3/Q	5A							
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	W	W	C	C	C	D	W
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	W	W	2/W	2/W	2/W	W	W
		Total kjeldahl nitrogen	3/Q	5A							
4b		Nitrate	3/Q	5A							
		Nitrite	3/Q	5A							
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q								
		Total organic carbon (TOC)	3/W	5A							
6	Total phosphorus	Total phosphorus	3/W	5A			M				
7	Specific conductance	Specific conductance	3/Q								
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	W	W	2/W	2/W	2/W	W	W
		Volatile suspended solids (VSS)	D								
9	Total metals	Aluminum	3/Q	5A							
		Beryllium	3/Q	5A							
		Cadmium	3/Q	5A							
		Chromium	3/Q[(e)]	5A	W		A	A		W	M
		Cobalt	3/Q	5A							
		Copper	3/Q	5A		M					M
		Lead	3/Q	5A							
		Molybdenum	3/Q	5A							
		Nickel	3/Q	5A							
		Silver	3/Q	5A							
		Thallium	3/Q	5A							

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 34 = Ashland Petroleum; 33 = Penreco; 32 = Quaker State, Keating; 31 = Quaker State, Emlenton; 30 = Pennsoil Co.; 29 = Gulf Oil Corp.; 28 = Witco Petrolia; 27 = Witco Chemical; 26 = United Refining Company; 25 = Gulf Oil Corp., Philadelphia; 23 = Agway Petroleum Corp.; 22 = Breslube-Penn, Inc.; 24 = BP Oil, Marcus Hook Refinery.

(d) Agway Petroleum lists no process water discharge.

(f) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-7 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[a]	U.S EPA[b]	Petroleum Refinery[c] 34	33	32	31	30	29	28
		Vanadium	3/Q								
		Zinc	3/Q	5A		W				M	M
10	Hydrides	Antimony	3/Q	5A							
		Arsenic	3/Q	5A							
		Selenium	3/Q	5A							
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		W		A	A		W	
12	Mercury	Mercury	3/Q	5A							
13	Total alkyl lead	Tetra-alkyl lead	3/Q								
		Tri-alkyl lead	3/Q								
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	W	W	2/W	2/W	2/W	W	M
15	Sulphide	Sulphide	3/W		W		2/W		2/W	W	M
16	Volatiles, Halogenated	1,1,2,2-Tetrachloroethane	3/Q	5A							
		1,1,2-Trichloroethane	3/Q	5A							
		1,1-Dichloroethane	3/Q	5A							
		1,1-Dichloroethylene	3/Q	5A							
		1,2-Dichlorobenzene	3/Q								
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A							
		1,2-Dichloropropane	3/Q	5A							
		1,3-Dichlorobenzene	3/Q								
		1,4-Dichlorobenzene	3/Q								
		Bromoform	3/Q	5A							
		Bromomethane	3/Q	5A							
		Carbon tetrachloride	3/Q	5A							
		Chlorobenzene	3/Q	5A							
		Chloroform	3/Q	5A							
		Chloromethane	3/Q	5A							
		Cis-1,3-Dichloropropylene	3/Q	5A							
		Dibromochloromethane	3/Q	5A							
		Dichlorobromomethane	3/Q	5A							
		Ethylene dibromide	3/Q								
		Methylene chloride	3/Q	5A							
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A							M
		Trans-1,2-Dichloroethylene	3/Q	5A							
		Trans-1,3-Dichloropropylene	3/Q								
		Trichloroethylene	3/Q	5A							
		Trichlorofluoromethane	3/Q	5A							
		Vinyl chloride (Chloroethylene)	3/Q	5A							

TABLE A-7 (Cont.)

Analytical Test Group					Petroleum Refinery$^{(c)}$						
No.	Name	Characterization Parameters	Ontario$^{(a)}$	U.S EPA$^{(b)}$	34	33	32	31	30	29	28
17	Volatiles, Non-Halogenated	Benzene	3/W	5A							
		Ethylbenzene	3/W	5A							
		Methyl ethyl ketone	3/Q								
		Styrene	3/Q								
		Toluene	3/W	5A							
		o-Xylene	3/W								
		m-Xylene and p-Xylene	3/W								
18	Volatiles, Water Soluble	Acrolein	3A	5A							
		Acrylonitrile	3A	5A							
		1,3-Butadiene	3A								
19	Extractables, Base Neutral	Acenaphthene	3/Q								
		5-nitro Acenaphthene	3/Q								
		Acenaphthylene	3/Q								
		Anthracene	3/Q								
		Benz(a)anthracene	3/Q								
		Benzo(a)pyrene	3/Q								
		Benzo(b)fluoranthene	3/Q								
		Benzo(ghi)perylene	3/Q								
		Benzo(k)fluoranthene	3/Q								
		Camphene	3/Q								
		1-Chloronaphthalene	3/Q								
		2-Chloronaphthalene	3/Q								
		Chrysene	3/Q								
		Dibenz(a,h)anthracene	3/Q								
		Fluoranthene	3/Q								
		Fluorene	3/Q								
		Indeno(1,2,3-cd)pyrene	3/Q								
		Indole	3/Q								
		1-Methylnaphthalene	3/Q								
		2-Methylnaphthalene	3/Q								
		Naphthalene	3/Q								
		Perylene	3/Q								
		Phenanthrene	3/Q								
		Pyrene	3/Q								
		Benzyl butyl phthalate	3A								
		Bis(2-ethyhexyl) phthalate	3A								
		Di-n-butyl phthalate	3A								
		Di-n-octyl phthalate	3A								
		4-Bromophenyl phenyl ether	3A								
		4-Chlorophenyl phenyl ether	3A								

TABLE A-7 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S EPA[(b)]	Petroleum Refinery[(c)]						
No.	Name				34	33	32	31	30	29	28
		Bis(2-chloroisopropyl)ether	3A								
		Bis(2-chloroethyl)ether	3A								
		Diphenyl ether	3A								
		2,4-Dinitrotoluene	3A								
		2,6-Dinitrotoluene	3A								
		Bis(2-chloroethoxy)methane	3A								
		Diphenylamine	3A								
		N-Nitrosodiphenylamine	3A								
		N-Nitrosodi-n-propylamine	3A								
20	Extractables, Acid (Phenolics)										
		2,3,4,5-Tetrachlorophenol	3/Q								
		2,3,4,6-Tetrachlorophenol	3/Q								
		2,3,5,6-Tetrachlorophenol	3/Q								
		2,3,4-Trichlorophenol	3/Q								
		2,3,5-Trichlorophenol	3/Q								
		2,4,5-Trichlorophenol	3/Q								
		2,4,6-Trichlorophenol	3/Q								
		2,4-Dimethyl phenol	3/Q								
		2,4-Dinitrophenol	3/Q								
		2,4-Dichlorophenol	3/Q								
		2,6-Dichlorophenol	3/Q								
		4,6-Dinitro-o-cresol	3/Q								
		2-Chlorophenol	3/Q								
		4-Chloro-3-methylphenol	3/Q								
		4-Nitrophenol	3/Q								
		m-Cresol	3/Q								
		o-Cresol	3/Q								
		p-Cresol	3/Q								
		Pentachlorophenol	3/Q								
		Phenol	3/Q								
21	Extractables, Phenoxy Acid Herbicides										
22	Extractables, Organochlorine Pesticides										
23	Extractables, Neutral Chlorinated										
		1,2,3,4-Tetrachlorobenzene	3A								
		1,2,3,5-Tetrachlorobenzene	3A								
		1,2,4,5-Tetrachlorobenzene	3A								
		1,2,3-Trichlorobenzene	3A								

TABLE A-7 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario$^{(a)}$	U.S EPA$^{(b)}$	Petroleum Refinery$^{(c)}$ 34	33	32	31	30	29	28
		1,2,4-Trichlorobenzene	3A								
		2,4,5-Trichlorotoluene	3A								
		Hexachlorobenzene	3A								
		Hexachlorobutadiene	3A								
		Hexachlorocyclopentadiene	3A								
		Hexachloroethane	3A								
		Octachlorostyrene	3A								
		Pentachlorobenzene	3A								
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A								
		Octachlorodibenzo-p-dioxin	3A								
		Octachlorodibenzofuran	3A								
		Total heptachlorinated dibenzo-p-dioxins	3A								
		Total hexachlorinated dibenzofurans	3A								
		Total hexachlorinated dibenzo-p-dioxins	3A								
		Total heptachlorinated dibenzofurans	3A								
		Total pentachlorinated dibenzo-p-dioxins	3A								
		Total pentachlorinated dibenzofurans	3A								
		Total tetrachlorinated dibenzo-p-dioxins	3A								
		Total tetrachlorinated dibenzofurans	3A								
25	Solvent Extractables	Oil and grease	3/W		W	W	2/W	2/W	2/W	W	W
26	Fatty and Resin Acids										
27	PCBs	PCBs (Aroclors)	3A								
	Additional Requirements	Toxicity testing	M								
		Flow	C	5A	C	C	C	C	C	C	C
	Additional State or U.S. EPA Requirements	Acridine									
		Aldrin									
		Benzidine									
		Bis chloromethyl ether		5A							
		BOD5 % removal								M	
		Carbonaceous BOD									
		Chloride									
		4-Chloro-n-cresol									
		Dichlorodifluoromethane		5A							
		P,P'-DDD									

TABLE A-7 (Cont.)

Analytical Test Group					Petroleum Refinery(c)						
No.	Name	Characterization Parameters	Ontario(a)	U.S EPA(b)	34	33	32	31	30	29	28
		p,p'-DDE									
		p,p'-DDT									
		3,3'-Dichlorobenzidine									
		Dibromomethane									
		Diethyl phthalate									
		Dimethyl phthalate									
		Dieldrin									
		Dissolved oxygen				W					W
		1,4-Dioxane									
		Endosulfan sulfate									
		Endrin aldehyde									
		Fecal coliforms		5A	W	W					W
		Free cyanide								M	
		First stage oxygen demand (FSOD)								M	
		Fluoride		5A							
		Hydrogen sulfide									
		Heptachlor									
		Heptachlor epoxide									
		Iron		5A							
		Un-ionized ammonia									
		Isophorone									
		Manganese		5A		W					
		MBAS									W
		Nitrobenzene									
		2-Nitrophenol									
		Temperature		5A						D	
		Thermal load									
		TSS % removal									
		Vinyl bromide									
		Bromide		5A							
		Chlorine total residue		5A							
		Color		5A							
		Sulfate as SO_4		5A							
		Sulfite, Sulfide		5A							
		Barium		5A							
		Boron		5A							
		Magnesium		5A							
		Tin		5A							
		Titanium		5A							

TABLE A-7 COMPARISON OF ONTARIO, U.S. EPA, AND PENNSYLVANIA MONITORING REQUIREMENTS (EXTENDED)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S EPA[(b)]	Petroleum Refinery[(c)] 27	26	25	23[(d)]	22	24
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	3/W	2/W	W		2/M	2/W
2	Cyanide	Cyanide	3/Q	5A						
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	C	C	D		2/M	D
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	3/W	2/W	W		2/M	2/W
4b		Total kjeldahl nitrogen	3/Q	5A						
		Nitrate	3/Q	5A						
		Nitrite	3/Q	5A						
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q							
		Total organic carbon (TOC)	3/W	5A						
6	Total phosphorus	Total phosphorus	3/W	5A						
7	Specific conductance	Specific conductance	3/Q							
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	3/W	2/W	W		2/M	2/W
		Volatile suspended solids (VSS)	D							
9	Total metals	Aluminum	3/Q	5A						
		Beryllium	3/Q	5A						
		Cadmium	3/Q	5A						
		Chromium	3/Q[(e)]	5A	A	2/W	W			2/W
		Cobalt	3/Q	5A						
		Copper	3/Q	5A						
		Lead	3/Q	5A					2/M	
		Molybdenum	3/Q	5A						
		Nickel	3/Q	5A						
		Silver	3/Q	5A						
		Thallium	3/Q	5A						
		Vanadium	3/Q							
		Zinc	3/Q	5A	1-2/W				2/M	
10	Hydrides	Antimony	3/Q	5A						
		Arsenic	3/Q	5A						
		Selenium	3/Q	5A						
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		3/W	2/W	W		2/M	2/W
12	Mercury	Mercury	3/Q	5A						

TABLE A-7 EXTENDED (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S EPA[(b)]	Petroleum Refinery[(c)] 27	26	25	23[(d)]	22	24
13	Total alkyl lead									
		Tetra-alkyl lead	3/Q							
		Tri-alkyl lead	3/Q							
14	Phenolics (4AAP)									
		Phenolics (4AAP)	D	5A	3/W	2/W	W		2/M	2/W
15	Sulphide									
		Sulphide	3/W		3/W	2/W	W			2/W
16	Volatiles, Halogenated									
		1,1,2,2-Tetrachloroethane	3/Q	5A						
		1,1,2-Trichloroethane	3/Q	5A						
		1,1-Dichloroethane	3/Q	5A						
		1,1-Dichloroethylene	3/Q	5A						
		1,2-Dichlorobenzene	3/Q							
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A						
		1,2-Dichloropropane	3/Q	5A						
		1,3-Dichlorobenzene	3/Q							
		1,4-Dichlorobenzene	3/Q							
		Bromoform	3/Q	5A						
		Bromomethane	3/Q	5A						
		Carbon tetrachloride	3/Q	5A						
		Chlorobenzene	3/Q	5A						
		Chloroform	3/Q	5A						
		Chloromethane	3/Q	5A						
		Cis-1,3-Dichloropropylene	3/Q	5A						
		Dibromochloromethane	3/Q	5A						
		Dichlorobromomethane	3/Q	5A						
		Ethylene dibromide	3/Q							
		Methylene chloride	3/Q	5A						
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A						
		Trans-1,2-Dichloroethylene	3/Q	5A						
		Trans-1,3-Dichloropropylene	3/Q							
		Trichloroethylene	3/Q	5A						
		Trichlorofluoromethane	3/Q	5A						
		Vinyl chloride (Chloroethylene)	3/Q	5A						
17	Volatiles, Non-Halogenated									
		Benzene	3/W	5A						
		Ethylbenzene	3/W	5A						
		Methyl ethyl ketone	3/Q							
		Styrene	3/Q							
		Toluene	3/W	5A						
		o-Xylene	3/W							
		m-Xylene and p-Xylene	3/W							

TABLE A-7 EXTENDED (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S EPA[(b)]	Petroleum Refinery[(c)] 27	26	25	23[(d)]	22	24
18	Volatiles, Water Soluble	Acrolein	3A	5A						
		Acrylonitrile	3A	5A						
		1,3-Butadiene	3A							
19	Extractables, Base Neutral	Acenaphthene	3/Q							
		5-nitro Acenaphthene	3/Q							
		Acenaphthylene	3/Q							
		Anthracene	3/Q							
		Benz(a)anthracene	3/Q							
		Benzo(a)pyrene	3/Q							
		Benzo(b)fluoranthene	3/Q							
		Benzo(ghi)perylene	3/Q							
		Benzo(k)fluoranthene	3/Q							
		Camphene	3/Q							
		1-Chloronaphthalene	3/Q							
		2-Chloronaphthalene	3/Q							
		Chrysene	3/Q							
		Dibenz(a,h)anthracene	3/Q							
		Fluoranthene	3/Q							
		Fluorene	3/Q							
		Indeno(1,2,3-cd)pyrene	3/Q							
		Indole	3/Q							
		1-Methylnaphthalene	3/Q							
		2-Methylnaphthalene	3/Q							
		Naphthalene	3/Q							
		Perylene	3/Q							
		Phenanthrene	3/Q							
		Pyrene	3/Q							
		Benzyl butyl phthalate	3A							
		Bis(2-ethyhexyl) phthalate	3A							
		Di-n-butyl phthalate	3A							
		Di-n-octyl phthalate	3A							
		4-Bromophenyl phenyl ether	3A							
		4-Chlorophenyl phenyl ether	3A							
		Bis(2-chloroisopropyl)ether	3A							
		Bis(2-chloroethyl)ether	3A							
		Diphenyl ether	3A							
		2,4-Dinitrotoluene	3A							
		2,6-Dinitrotoluene	3A							
		Bis(2-chloroethoxy)methane	3A							
		Diphenylamine	3A							

TABLE A-7 EXTENDED (Cont.)

Analytical Test Group					Petroleum Refinery[c]					
No.	Name	Characterization Parameters	Ontario[a]	U.S EPA[b]	27	26	25	23[d]	22	24
		N-Nitrosodiphenylamine	3A							
		N-Nitrosodi-n-propylamine	3A							
20	Extractables, Acid (Phenolics)									
		2,3,4,5-Tetrachlorophenol	3/Q							
		2,3,4,6-Tetrachlorophenol	3/Q							
		2,3,5,6-Tetrachlorophenol	3/Q							
		2,3,4-Trichlorophenol	3/Q							
		2,3,5-Trichlorophenol	3/Q							
		2,4,5-Trichlorophenol	3/Q							
		2,4,6-Trichlorophenol	3/Q							
		2,4-Dimethyl phenol	3/Q							
		2,4-Dinitrophenol	3/Q							
		2,4-Dichlorophenol	3/Q							
		2,6-Dichlorophenol	3/Q							
		4,6-Dinitro-o-cresol	3/Q							
		2-Chlorophenol	3/Q							
		4-Chloro-3-methylphenol	3/Q							
		4-Nitrophenol	3/Q							
		m-Cresol	3/Q							
		o-Cresol	3/Q							
		p-Cresol	3/Q							
		Pentachlorophenol	3/Q							
		Phenol	3/Q							
21	Extractables, Phenoxy Acid Herbicides									
22	Extractables, Organochlorine Pesticides									
23	Extractables, Neutral Chlorinated									
		1,2,3,4-Tetrachlorobenzene	3A							
		1,2,3,5-Tetrachlorobenzene	3A							
		1,2,4,5-Tetrachlorobenzene	3A							
		1,2,3-Trichlorobenzene	3A							
		1,2,4-Trichlorobenzene	3A							
		2,4,5-Trichlorotoluene	3A							
		Hexachlorobenzene	3A							
		Hexachlorobutadiene	3A							
		Hexachlorocyclopentadiene	3A							
		Hexachloroethane	3A							
		Octachlorostyrene	3A							
		Pentachlorobenzene	3A							

TABLE A-7 EXTENDED (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S EPA[b]	Petroleum Refinery[c]					
No.	Name				27	26	25	23[d]	22	24
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A							
		Octachlorodibenzo-p-dioxin	3A							
		Octachlorodibenzofuran	3A							
		Total heptachlorinated dibenzo-p-dioxins	3A							
		Total hexachlorinated dibenzofurans	3A							
		Total hexachlorinated dibenzo-p-dioxins	3A							
		Total heptachlorinated dibenzofurans	3A							
		Total pentachlorinated dibenzo-p-dioxins	3A							
		Total pentachlorinated dibenzofurans	3A							
		Total tetrachlorinated dibenzo-p-dioxins	3A							
		Total tetrachlorinated dibenzofurans	3A							
25	Solvent Extractables	Oil and grease	3/W		3/W	2/W	W		2/M	2/W
26	Fatty and Resin Acids									
27	PCBs	PCBs (Aroclors)	3A							
	Additional Requirements	Toxicity testing	M							
		Flow	C	5A	C	C	C		2/M	C
	Additional State or U.S. EPA Requirements	Acridine								
		Aldrin								
		Benzidine								
		Bis chloromethyl ether		5A						
		BOD5 % removal								2/W
		Carbonaceous BOD								
		Chloride								
		4-Chloro-n-cresol								
		Dichlorodifluoromethane		5A						
		p,p'-DDD								
		p,p'-DDE								
		p,p'-DDT								
		3,3'-Dichlorobenzidine								
		Dibromomethane								
		Diethyl phthalate								
		Dimethyl phthalate								
		Dieldrin								
		Dissolved oxygen								

TABLE A-7 EXTENDED (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S EPA[(b)]	Petroleum Refinery[(c)] 27	26	25	23[(d)]	22	24
		1,4-Dioxane								
		Endosulfan sulfate								
		Endrin aldehyde		5A						
		Fecal coliforms			1-2/W		W		2/M	
		Free cyanide					H			2/W
		First stage oxygen demand (FSOD)		5A						2/W
		Fluoride				2/W				
		Hydrogen sulfide								
		Heptachlor								
		Heptachlor epoxide		5A						
		Iron								
		Un-ionized ammonia								
		Isophorene		5A					2/M	
		Manganese								
		MBAS								
		Nitrobenzene								
		2-Nitrophenol		5A					2/M	
		Temperature								
		Thermal load								
		TSS % removal								
		Vinyl bromide		5A						
		Bromide		5A						
		Chlorine total residue		5A						
		Color		5A						
		Sulfate as SO_4		5A						
		Sulfite, Sulfide		5A						
		Barium		5A						
		Boron		5A						
		Magnesium		5A						
		Tin		5A						
		Titanium								

TABLE A-8 COMPARISON OF ONTARIO, U.S. EPA, AND GREAT LAKES DRAINAGE BASIN MONITORING REQUIREMENTS

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]				
No.	Name				1	5	8	10	17
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	2/W	2/W	2/W	2/W	2/W
2	Cyanide	Cyanide	3/Q	5A					2/W
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	D	2/W	D	2/W	(e)
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	2/W	2/W	2/W	2/W	2/W
		Total kjeldahl nitrogen	3/Q	5A					
4b		Nitrate	3/Q	5A					
		Nitrite	3/Q	5A					
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q						
		Total organic carbon (TOC)	3/W	5A					
6	Total phosphorus	Total phosphorus	3/W	5A			M		
7	Specific conductance	Specific conductance	3/Q						
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	2/W	2/W	2/W	2/W	2/W
		Volatile suspended solids (VSS)	D						
9	Total metals	Aluminum	3/Q	5A					
		Beryllium	3/Q	5A					
		Cadmium	3/Q[(f)]	5A					
		Chromium	3/Q	5A	2/W	2/W	2/W	2/W	2/W
		Cobalt	3/Q	5A					
		Copper	3/Q	5A					
		Lead	3/Q	5A	I				
		Molybdenum	3/Q	5A					
		Nickel	3/Q	5A					
		Silver	3/Q	5A					
		Thallium	3/Q	5A					

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times in any one week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for these pollutants in effluent once every 5 years as part of NPDES permit renewal [40 CFR 122.21 (g)(7)].

(c) 1 = Murphy Oil USA, Inc., Wisconsin; 5 = Total Petroleum, Inc., Michigan; 8 = Sun Refining and Marketing, Ohio; 16 = Texaco Refining and Marketing, Illinois; 21 = Amoco Oil Company, Indiana.

(d) This refinery is closed.

(e) No frequency given.

(f) If used in process, analyze 3/W, otherwise 3Q.

TABLE A-8 (Cont.)

Analytical Test Group					Petroleum Refinery(c)				
No.	Name	Characterization Parameters	Ontario(a)	U.S. EPA(b)	1	5	8	10	17
		Vanadium	3/Q						
		Zinc	3/Q(f)	5A					
10	Hydrides	Antimony	3/Q	5A					
		Arsenic	3/Q	5A					
		Selenium	3/Q	5A					
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		2/W	2/W	2/W	2/W	2/W
12	Mercury	Mercury	3/Q	5A					
13	Total alkyl lead	Tetra-alkyl lead	3/Q						
		Tri-alkyl lead	3/Q						
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	2/W	2/W	2/W	2/W	2/W
15	Sulphide	Sulphide	3/W		2/W	2/W	2/W	2/W	2/W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A			Q	Q	
		1,1,2-Trichloroethane	3/Q	5A			Q	Q	
		1,1-Dichloroethane	3/Q	5A			Q	Q	
		1,1-Dichloroethylene	3/Q	5A			2/A	2/A	
		1,2-Dichlorobenzene	3/Q				Q	Q	
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A			Q	Q	
		1,2-Dichloropropane	3/Q	5A			Q	Q	
		1,3-Dichlorobenzene	3/Q				Q	Q	
		1,4-Dichlorobenzene	3/Q				Q	Q	
		Bromoform	3/Q	5A			Q	Q	
		Bromomethane	3/Q	5A					
		Carbon tetrachloride	3/Q	5A			Q	Q	
		Chlorobenzene	3/Q	5A			Q	Q	
		Chloroform	3/Q	5A			Q	Q	
		Chloromethane	3/Q	5A			Q	Q	
		Cis-1,3-Dichloropropylene	3/Q	5A			2/A	2/A	
		Dibromochloromethane	3/Q	5A			Q	Q	
		Dichlorobromomethane	3/Q	5A			Q	Q	
		Ethylene dibromide	3/Q						
		Methylene chloride	3/Q	5A			Q	Q	
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A			Q	Q	
		Trans-1,2-Dichloroethylene	3/Q	5A			2/A	2/A	
		Trans-1,3-Dichloropropylene	3/Q				Q	Q	
		Trichloroethylene	3/Q	5A			Q	Q	
		Trichlorofluoromethane	3/Q	5A					
		Vinyl chloride (Chloroethylene)	3/Q	5A			Q	Q	

TABLE A-8 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)]				
No.	Name				1	5	8	10	17
17	Volatiles, Non-Halogenated	Benzene	3/W	5A		2/M	Q	Q	
		Ethylbenzene	3/W	5A			Q	Q	
		Methyl ethyl ketone	3/Q						
		Styrene	3/Q						
		Toluene	3/W	5A			Q	Q	
		o-Xylene	3/W						
		m-Xylene and p-Xylene	3/W						
18	Volatiles, Water Soluble	Acrolein	3A	5A					
		Acrylonitrile	3A	5A			Q		
		1,3-Butadiene	3A						
19	Extractables, Base Neutral	Acenaphthene	3/Q				Q	Q	
		5-nitro Acenaphthene	3/Q						
		Acenaphthylene	3/Q				Q	Q	
		Anthracene	3/Q				Q	Q	
		Benz(a)anthracene	3/Q				Q	Q	
		Benzo(a)pyrene	3/Q				Q	Q	
		Benzo(b)fluoranthene	3/Q				Q	Q	
		Benzo(ghi)perylene	3/Q				Q	Q	
		Benzo(k)fluoranthene	3/Q				Q	Q	
		Camphene	3/Q						
		1-Chloronaphthalene	3/Q						
		2-Chloronaphthalene	3/Q				A	A	
		Chrysene	3/Q				Q	Q	
		Dibenz(a,h)anthracene	3/Q				Q	Q	
		Fluoranthene	3/Q				Q	Q	
		Fluorene	3/Q				Q	Q	
		Indeno(1,2,3-cd)pyrene	3/Q				Q	Q	
		Indole	3/Q						
		1-Methylnaphthalene	3/Q						
		2-Methylnaphthalene	3/Q						
		Naphthalene	3/Q				Q	Q	
		Perylene	3/Q						
		Phenanthrene	3/Q				Q	Q	
		Pyrene	3/Q				Q	Q	
		Benzyl butyl phthalate	3A				A	A	
		Bis(2-ethyhexyl) phthalate	3A				A	A	
		Di-n-butyl phthalate	3A				A	A	
		Di-n-octyl phthalate	3A				A	A	
		4-Bromophenyl phenyl ether	3A						
		4-Chlorophenyl phenyl ether	3A						

TABLE A-8 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario(a)	U.S. EPA(b)	Petroleum Refinery(c) 1	5	8	10	17
		Bis(2-chloroisopropyl)ether	3A				A	A	
		Bis(2-chloroethyl)ether	3A				A	A	
		Diphenyl ether	3A						
		2,4-Dinitrotoluene	3A						
		2,6-Dinitrotoluene	3A						
		Bis(2-chloroethoxy)methane	3A				A	A	
		Diphenylamine	3A						
		N-Nitrosodiphenylamine	3A				A	A	
		N-Nitrosodi-n-propylamine	3A				A	A	
20	Extractables, Acid (Phenolics)								
		2,3,4,5-Tetrachlorophenol	3/Q						
		2,3,4,6-Tetrachlorophenol	3/Q						
		2,3,5,6-Tetrachlorophenol	3/Q						
		2,3,4-Trichlorophenol	3/Q						
		2,3,5-Trichlorophenol	3/Q						
		2,4,5-Trichlorophenol	3/Q						
		2,4,6-Trichlorophenol	3/Q				A	A	
		2,4-Dimethyl phenol	3/Q				A	A	
		2,4-Dinitrophenol	3/Q				A	A	
		2,4-Dichlorophenol	3/Q				A	A	
		2,6-Dichlorophenol	3/Q						
		4,6-Dinitro-o-cresol	3/Q				A	A	
		2-Chlorophenol	3/Q				A	A	
		4-Chloro-3-methylphenol	3/Q						
		4-Nitrophenol	3/Q				A	A	
		m-Cresol	3/Q						
		o-Cresol	3/Q						
		p-Cresol	3/Q						
		Pentachlorophenol	3/Q				A	A	
		Phenol	3/Q				A	A	
21	Extractables, Phenoxy Acid Herbicides								
22	Extractables, Organochlorine Pesticides								
23	Extractables, Neutral Chlorinated								
		1,2,3,4-Tetrachlorobenzene	3A						
		1,2,3,5-Tetrachlorobenzene	3A						
		1,2,4,5-Tetrachlorobenzene	3A						
		1,2,3-Trichlorobenzene	3A						

TABLE A-8 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]				
No.	Name				1	5	8	10	17
		1,2,4-Trichlorobenzene	3A				A	A	
		2,4,5-Trichlorotoluene	3A						
		Hexachlorobenzene	3A				A	A	
		Hexachlorobutadiene	3A				A	A	
		Hexachlorocyclopentadiene	3A				A	A	
		Hexachloroethane	3A				A	A	
		Octachlorostyrene	3A						
		Pentachlorobenzene	3A						
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A						
		Octachlorodibenzo-p-dioxin	3A						
		Octachlorodibenzofuran	3A						
		Total heptachlorinated dibenzo-p-dioxins	3A						
		Total hexachlorinated dibenzofurans	3A						
		Total hexachlorinated dibenzo-p-dioxins	3A						
		Total heptachlorinated dibenzofurans	3A						
		Total pentachlorinated dibenzo-p-dioxins	3A						
		Total pentachlorinated dibenzofurans	3A						
		Total tetrachlorinated dibenzo-p-dioxins	3A						
		Total tetrachlorinated dibenzofurans	3A						
25	Solvent Extractables	Oil and grease	3/W		2/W	5/W	2/W	2/W	2/W
26	Fatty and Resin Acids								
27	PCBs	PCBs (Aroclors)	3A						
	Additional Requirements	Toxicity testing	M						
		Flow	C	5A	D	5/W	D	D	D
	Additional State or U.S. EPA Requirements	Acridine							
		Aldrin							
		Benzidine					A	A	
		Bis chloromethyl ether		5A					
		BOD5 % removal							
		Carbonaceous BOD				2/W			
		Chloride							
		4-Chloro-m-cresol					A	A	
		Dichlorodifluoromethane		5A					
		p,p'-DDD							

TABLE A-8 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]				
No.	Name				1	5	8	10	17
		p,p'-DDE							
		p,p'-DDT							
		Diethyl phthalate					A	A	
		Dimethyl phthalate					A	A	
		Dieldrin							
		Dissolved oxygen				2/W	D		
		1,4-Dioxane							
		Endosulfan sulfate							
		Endrin aldehyde							
		Fecal coliforms		5A					
		Free cyanide							
		First stage oxygen demand (FSOD)							
		Fluoride		5A					2/W
		Hydrogen sulfide							
		Heptachlor							
		Heptachlor epoxide							
		Iron		5A					
		Un-ionized ammonia							
		Isophorone				A	A		
		Manganese		5A					
		MBAS							
		Nitrobenzene				A	A		
		2-Nitrophenol				A	A		
		Temperature		5A		D	D		
		Thermal load							
		TSS % removal							
		Vinyl bromide							
		BOD5		5A	2/W	2/W	2/W	2/W	2/W
		1,1,1-Trichloroethane				Q	Q		
		Dibromomethane				Q	Q		
		Ethyl chloride		5A		Q	Q		
		2-Chloroethylvinylether		5A		Q	Q		
		Total Dissolved Solids							
		3,3'-Dichlorobenzidine				A	A		
		Bromide		5A					
		Chlorine, total residue		5A					
		Color		5A					
		Radioactivity		5A					
		Sulfate as SO_4		5A					
		Sulfite, sulfide		5A					
		Surfactants		5A					

TABLE A-8 (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]				
No.	Name				1	5	8	10	17
		Barium		5A					
		Boron		5A					
		Magnesium		5A					
		Tin		5A					
		Titanium		5A					

TABLE A-8 COMPARISON OF ONTARIO, U.S. EPA, AND GREAT LAKES DRAINAGE BASIN MONITORING REQUIREMENTS (EXTENDED)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]	
No.	Name				16[d]	21
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A		3/W
2	Cyanide	Cyanide	3/Q	5A		
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	I	3/W
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A		5/W
4b		Total Kjeldahl nitrogen	3/Q	5A		
		Nitrate	3/Q	5A		
		Nitrite	3/Q	5A		
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q			
		Total organic carbon (TOC)	3/W	5A		
6	Total phosphorus	Total phosphorus	3/W	5A		
7	Specific conductance	Specific conductance	3/Q			
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	I	5/W
		Volatile suspended solids (VSS)	D			
9	Total metals	Aluminum	3/Q	5A		
		Beryllium	3/Q	5A		
		Cadmium	3/Q	5A		
		Chromium	3/Q(f)	5A	I	W
		Cobalt	3/Q	5A		
		Copper	3/Q	5A		
		Lead	3/Q	5A	I	
		Molybdenum	3/Q	5A		
		Nickel	3/Q	5A		
		Silver	3/Q	5A		
		Thallium	3/Q	5A		
		Vanadium	3/Q			
		Zinc	3/Q(f)	5A		
10	Hydrides	Antimony	3/Q	5A		
		Arsenic	3/Q	5A		
		Selenium	3/Q	5A		M
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		I	W

TABLE A-8 EXTENDED (Cont.)

Analytical Test Group		Characterization Parameters	Ontario[a]	U.S. EPA[b]	Petroleum Refinery[c]	
No.	Name				16[d]	21
12	Mercury	Mercury	3/Q	5A		
13	Total alkyl lead	Tetra-alkyl lead	3/Q			
		Tri-alkyl lead	3/Q			
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	I	3/W
15	Sulphide	Sulphide	3/W			W
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A	2/A	
		1,1,2-Trichloroethane	3/Q	5A	2/A	
		1,1-Dichloroethane	3/Q	5A	2/A	
		1,1-Dichloroethylene	3/Q	5A	2/A	
		1,2-Dichlorobenzene	3/Q		2/A	
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A	2/A	
		1,2-Dichloropropane	3/Q	5A	2/A	
		1,3-Dichlorobenzene	3/Q		2/A	
		1,4-Dichlorobenzene	3/Q		2/A	
		Bromoform	3/Q	5A	2/A	
		Bromomethane	3/Q	5A		
		Carbon tetrachloride	3/Q	5A	2/A	
		Chlorobenzene	3/Q	5A	2/A	
		Chloroform	3/Q	5A	2/A	
		Chloromethane	3/Q	5A	2/A	
		Cis-1,3-Dichloropropylene	3/Q	5A	2/A	
		Dibromochloromethane	3/Q	5A	2/A	
		Dichlorobromomethane	3/Q	5A	2/A	
		Ethylene dibromide	3/Q			
		Methylene chloride	3/Q	5A	2/A	
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A	2/A	
		Trans-1,2-Dichloroethylene	3/Q	5A	2/A	
		Trans-1,3-Dichloropropylene	3/Q		2/A	
		Trichloroethylene	3/Q	5A	2/A	
		Trichlorofluoromethane	3/Q	5A		
		Vinyl chloride (Chloroethylene)	3/Q	5A	2/A	
17	Volatiles, Non-Halogenated	Benzene	3/W	5A	2/A	
		Ethylbenzene	3/W	5A	2/A	
		Methyl ethyl ketone	3/Q			
		Styrene	3/Q			
		Toluene	3/W	5A	2/A	
		o-Xylene	3/W			
		m-Xylene and p-Xylene	3/W			

TABLE A-8 EXTENDED (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[(a)]	U.S. EPA[(b)]	Petroleum Refinery[(c)] 16[(d)]	Petroleum Refinery[(c)] 21
18	Volatiles, Water Soluble	Acrolein	3A	5A		
		Acrylonitrile	3A	5A		
		1,3-Butadiene	3A			
19	Extractables, Base Neutral	Acenaphthene	3/Q		2/A	
		5-nitro Acenaphthene	3/Q			
		Acenaphthylene	3/Q		2/A	
		Anthracene	3/Q		2/A	
		Benz(a)anthracene	3/Q		2/A	
		Benzo(a)pyrene	3/Q		2/A	
		Benzo(b)fluoranthene	3/Q		2/A	
		Benzo(ghi)perylene	3/Q		2/A	
		Benzo(k)fluoranthene	3/Q		2/A	
		Camphene	3/Q			
		1-Chloronaphthalene	3/Q			
		2-Chloronaphthalene	3/Q		2/A	
		Chrysene	3/Q		2/A	
		Dibenz(a,h)anthracene	3/Q		2/A	
		Fluoranthene	3/Q		2/A	
		Fluorene	3/Q		2/A	
		Indeno(1,2,3-cd)pyrene	3/Q		2/A	
		Indole	3/Q			
		1-Methylnaphthalene	3/Q			
		2-Methylnaphthalene	3/Q			
		Naphthalene	3/Q		2/A	
		Perylene	3/Q			
		Phenanthrene	3/Q		2/A	
		Pyrene	3/Q		2/A	
		Benzyl butyl phthalate	3A		2/A	
		Bis(2-ethyhexyl) phthalate	3A		2/A	
		Di-n-butyl phthalate	3A		2/A	
		Di-n-octyl phthalate	3A		2/A	
		4-Bromophenyl phenyl ether	3A			
		4-Chlorophenyl phenyl ether	3A			
		Bis(2-chloroisopropyl)ether	3A		2/A	
		Bis(2-chloroethyl)ether	3A		2/A	
		Diphenyl ether	3A			
		2,4-Dinitrotoluene	3A			
		2,6-Dinitrotoluene	3A			
		Bis(2-chloroethoxy)methane	3A		2/A	
		Diphenylamine	3A			

TABLE A-8 EXTENDED (Cont.)

Analytical Test Group					Petroleum Refinery[c]	
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	16[d]	21
		N-Nitrosodiphenylamine	3A			
		N-Nitrosodi-n-propylamine	3A		2/A	
20	Extractables, Acid (Phenolics)	?,3,4,5-Tetrachlorophenol	3/Q			
		2,3,4,6-Tetrachlorophenol	3/Q			
		2,3,5,6-Tetrachlorophenol	3/Q			
		2,3,4-Trichlorophenol	3/Q			
		2,3,5-Trichlorophenol	3/Q			
		2,4,5-Trichlorophenol	3/Q			
		2,4,6-Trichlorophenol	3/Q		2/A	
		2,4-Dimethyl phenol	3/Q		2/A	
		2,4-Dinitrophenol	3/Q		2/A	
		2,4-Dichlorophenol	3/Q		2/A	
		2,6-Dichlorophenol	3/Q			
		4,6-Dinitro-o-cresol	3/Q		2/A	
		2-Chlorophenol	3/Q		2/A	
		4-Chloro-3-methylphenol	3/Q			
		4-Nitrophenol	3/Q		2/A	
		m-Cresol	3/Q			
		o-Cresol	3/Q			
		p-Cresol	3/Q			
		Pentachlorophenol	3/Q		2/A	
		Phenol	3/Q		2/A	
21	Extractables, Phenoxy Acid Herbicides					
22	Extractables, Organochlorine Pesticides					
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A		2/A	
		1,2,3,5-Tetrachlorobenzene	3A			
		1,2,4,5-Tetrachlorobenzene	3A			
		1,2,3-Trichlorobenzene	3A			
		1,2,4-Trichlorobenzene	3A			
		2,4,5-Trichlorotoluene	3A			
		Hexachlorobenzene	3A		2/A	
		Hexachlorobutadiene	3A		2/A	
		Hexachlorocyclopentadiene	3A			
		Hexachloroethane	3A		2/A	
		Octachlorostyrene	3A			
		Pentachlorobenzene	3A			

TABLE A-8 EXTENDED (Cont.)

Analytical Test Group					Petroleum Refinery[c]	
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	16[d]	21
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans					
		2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A			
		Octachlorodibenzo-p-dioxin	3A			
		Octachlorodibenzofuran	3A			
		Total heptachlorinated dibenzo-p-dioxins	3A			
		Total hexachlorinated dibenzofurans	3A			
		Total hexachlorinated dibenzo-p-dioxins	3A			
		Total heptachlorinated dibenzofurans	3A			
		Total pentachlorinated dibenzo-p-dioxins	3A			
		Total pentachlorinated dibenzofurans	3A			
		Total tetrachlorinated dibenzo-p-dioxins	3A			
		Total tetrachlorinated dibenzofurans	3A			
25	Solvent Extractables	Oil and grease	3/W		I	5/W
26	Fatty and Resin Acids					
27	PCBs	PCBs (Aroclors)	3A		2/A	
	Additional Requirements	Toxicity testing	M			
		Flow	C	5A		C
	Additional State or U.S. EPA Requirements					
		Acridine				
		Aldrin			2/A	
		Benzidine				
		Bis chloromethyl ether		5A		
		BOD5 % removal				
		Carbonaceous BOD			I	
		Chloride				
		4-Chloro-n-cresol			2/A	
		Dichlorodifluoromethane		5A		
		p,p'-DDD			2/A	
		p,p'-DDE			2/A	
		p,p'-DDT			2/A	
		Dibromomethane				
		Diethyl phthalate			2/A	
		Dimethyl phthalate			2/A	
		Dieldrin			2/A	
		Dissolved oxygen				

TABLE A-8 EXTENDED (Cont.)

Analytical Test Group					Petroleum Refinery[c]	
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	16[d]	21
		1,4-Dioxane				
		Endosulfan sulfate			2/A	
		Endrin aldehyde			2/A	
		Fecal coliforms		5/A		
		Free cyanide				
		First stage oxygen demand (FSOD)				
		Fluoride		5/A		
		Hydrogen sulfide				
		Heptachlor			2/A	
		Heptachlor epoxide			2/A	
		Iron		5/A		
		Un-ionized ammonia				
		Isophorone			2/A	
		Manganese		5/A		
		MBAS				
		Nitrobenzene			2/A	
		2-Nitrophenol			2/A	
		Temperature		5A		
		Thermal load				
		TSS % removal				
		Vinyl bromide				
		BOD5		5A		5/W
		1,1,1-Trichloroethane			2/A	
		Ethyl chloride		5A	2/A	
		2-Chloroethylvinylether		5A	2/A	
		Total dissolved solids				
		3,3'-Dichlorobenzidine			2/A	
		Bromide		5/A		
		Chlorine, total residue		5/A		
		Color		5/A		
		Radioactivity		5/A		
		Sulfate as SO_4		5/A		
		Sulfite, Sulfide		5/A		
		Surfactants		5/A		
		Barium		5/A		
		Boron		5/A		
		Magnesium		5/A		
		Tin		5/A		
		Titanium		5/A		

TABLE A-9 COMPARISON OF ONTARIO, U.S. EPA, AND MOST STRINGENT MONITORING REQUIREMENTS

Analytical Test Group						
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Monitoring Requirement	Permit(s) with Requirement[c]
1	Chemical Oxygen Demand	Chemical oxygen demand (COD)	3/Q	5A	3/W	7,21,27
2	Cyanide	Cyanide	3/Q	5A	2/W	9,13,15,17
3	Hydrogen ion (pH)	Hydrogen ion (pH)	D	5A	C	2,3,20,26,27, 30,31,32
4a	Nitrogen	Ammonia plus Ammonium	3/W	5A	5/W	21
		Total kjeldahl nitrogen	3/Q	5A		
4b		Nitrate	3/Q	5A		
		Nitrite	3/Q	5A		
5	Organic carbon	Dissolved organic carbon (DOC)	3/Q			
		Total organic carbon (TOC)	3/W	5A	M	19
6	Total phosphorus	Total phosphorus	3/W	5A	2/W	9
7	Specific conductance	Specific conductance	3/Q			
8	Suspended solids	Total suspended solids (TSS)	3/W	5A	5/W	21
		Volatile suspended solids (VSS)	D			
9	Total metals	Aluminum	3/Q	5A		
		Beryllium	3/Q	5A		
		Cadmium	3/Q	5A		
		Chromium	3/Q[d]	5A	3/W	3,7
		Cobalt	3/Q	5A		
		Copper	3/Q	5A	2/M	22
		Lead	3/Q	5A	W	7
		Molybdenum	3/Q	5A		
		Nickel	3/Q	5A		
		Silver	3/Q	5A	2/M	22
		Thallium	3/Q	5A	2/M	27
		Vanadium	3/Q			
		Zinc	3/Q[d]	5A	2/W	27

(a) A = annual; 5A = once per 5 years; 3A = once per 3 years; 3/Q = three times per week once in a 3-month period; Q = quarterly; M = monthly; W = weekly; x/W = x times per week; D = daily; C = continuous; I = intermittent--monitor per discharge.

(b) EPA requires analysis for those pollutants in effluent once every 5 years as a part of NPDES permit renewal [40 CFR 122.21(g)(7)].

(c) ID number corresponds to specific refineries listed in Table 1-1.

(d) If used in process, analyze 3/W, otherwise 3/Q.

TABLE A-9 (Cont.)

Analytical Test Group						
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Monitoring Requirement	Permit(s) with Requirement[c]
10	Hydrides	Antimony	3/Q	5A		
		Arsenic	3/Q	5A		
		Selenium	3/Q	5A	M	21
11	Chromium (Hexavalent)	Chromium (Hexavalent)	3/Q		3/W	3,27
12	Mercury	Mercury	3/Q	5A		
13	Total alkyl lead	Tetra-alkyl lead	3/Q			
		Tri-alkyl lead	3/Q			
14	Phenolics (4AAP)	Phenolics (4AAP)	D	5A	3/W	3,21,27
15	Sulphide	Sulphide	3/W		3/W	27
16	Volatiles, Halogenated	1,1,2,1-Tetrachloroethane	3/Q	5A	Q	7,8,9,10,11
		1,1,2-Trichloroethane	3/Q	5A	Q	7,8,9,10,11
		1,1-Dichloroethane	3/Q	5A	Q	7,8,9,10,11
		1,1-Dichloroethylene	3/Q	5A	2/A	7,8,9,10,11,16
		1,2-Dichlorobenzene	3/Q		Q	7,8,9,10,11
		1,2-Dichloroethane (Ethylene dichloride)	3/Q	5A	Q	7,8,9,10,11
		1,2-Dichloropropane	3/Q	5A	Q	7,8,9,10,11
		1,3-Dichlorobenzene	3/Q		Q	7,8,9,10,11
		1,4-Dichlorobenzene	3/Q		Q	7,8,9,10,11
		Bromoform	3/Q	5A	Q	7,8,9,10,11
		Bromomethane	3/Q	5A		
		Carbon tetrachloride	3/Q	5A	Q	7,8,9,10,11
		Chlorobenzene	3/Q	5A	Q	7,8,9,10,11
		Chloroform	3/Q	5A	W	20
		Chloromethane	3/Q	5A	Q	7,8,9,10,11
		Cis-1,3-Dichloropropylene	3/Q	5A	2/A	7,8,9,10,11
		Dibromochloromethane	3/Q	5A	Q	7,8,9,10,11
		Dichlorobromomethane	3/Q	5A	Q	7,8,9,10,11
		Ethylene dibromide	3/Q			
		Methylene chloride	3/Q	5A	Q	7,8,9,10,11
		Tetrachloroethylene (Perchloroethylene)	3/Q	5A	Q	7,8,9,10,11
		Trans-1,2-Dichloroethylene	3/Q	5A	2/A	7,8,9,10,11,16
		Trans-1,3-Dichloropropylene	3/Q		Q	7,8,9,10,11
		Trichloroethylene	3/Q	5A	Q	7,8,9,10,11
		Trichlorofluoromethane	3/Q	5A		
		Vinyl chloride (Chloroethylene)	3/Q	5A	Q	7,8,9,10,11
17	Volatiles, Non-Halogenated	Benzene	3/W	5A	2/M	5
		Ethylbenzene	3/W	5A	Q	7,8,9,10,11
		Methyl ethyl ketone	3/Q			
		Styrene	3/Q			

TABLE A-9 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Monitoring Requirement	Permit(s) with Requirement[c]
		Toluene	3/W	5A	Q	7,8,9,10,11
		o-Xylene	3/W			
		m-Xylene and p-Xylene	3/W			
18	Volatiles, Water Soluble	Acrolein	3A	5A		
		Acrylonitrile	3A	5A	Q	8,9
		1,3-Butadiene	3A			
19	Extractables, Base Neutral	Acenaphthene	3/Q		Q	7,8,9,10,11
		5-nitro Acenaphthene	3/Q			
		Acenaphthylene	3/Q		Q	7,8,9,10,11
		Anthracene	3/Q		Q	7,8,9,10,11
		Benz(a)anthracene	3/Q		Q	7,8,9,10,11
		Benzo(a)pyrene	3/Q		Q	7,8,9,10,11
		Benzo(b)fluoranthene	3/Q		Q	7,8,9,10,11
		Benzo(ghi)perylene	3/Q		Q	7,8,9,10,11
		Benzo(k)fluoranthene	3/Q		Q	7,8,9,10,11
		Camphene	3/Q			
		1-Chloronaphthalene	3/Q			
		2-Chloronaphthalene	3/Q		2/A	14,16
		Chrysene	3/Q		Q	7,8,9,10,11
		Dibenz(a,h)anthracene	3/Q		Q	7,8,9,10,11
		Fluoranthene	3/Q		Q	7,8,9,10,11
		Fluorene	3/Q		Q	7,8,9,10,11
		Indeno(1,2,3-cd)pyrene	3/Q		Q	7,8,9,10,11
		Indole	3/Q			
		1-Methylnaphthalene	3/Q		Q	7,8,9,10,11
		2-Methylnaphthalene	3/Q			
		Naphthalene	3/Q		Q	7,8,9,10,11
		Perylene	3/Q			
		Phenanthrene	3/Q		Q	7,8,9,10,11
		Pyrene	3/Q		Q	7,8,9,10,11
		Benzyl butyl phthalate	3A		2/A	14,16
		Bis(2-ethyhexyl) phthalate	3A		2/A	14,16
		Di-n-butyl phthalate	3A		2/A	14,16
		Di-n-octyl phthalate	3A		2/A	14,16
		4-Bromophenyl phenyl ether	3A		2/A	14,16
		4-Chlorophenyl phenyl ether	3A		2/A	14,16
		Bis(2-chloroisopropyl)ether	3A		2/A	14,16
		Bis(2-chloroethyl)ether	3A		2/A	14,16
		Diphenyl ether	3A			

TABLE A-9 (Cont.)

Analytical Test Group No.	Analytical Test Group Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Monitoring Requirement	Permit(s) with Requirement[c]
		2,4-Dinitrotoluene	3A		2/A	14,16
		2,6-Dinitrotoluene	3A		2/A	14,16
		Bis(2-chloroethoxy)methane	3A		2/A	14,16
		Diphenylamine	3A			
		N-Nitrosodiphenylamine	3A		A	7,8,9,10,11
		N-Nitrosodi-n-propylamine	3A		2/A	14,16
20	Extractables, Acid (Phenolics)	2,3,4,5-Tetrachlorophenol	3/Q			
		2,3,4,6-Tetrachlorophenol	3/Q			
		2,3,5,6-Tetrachlorophenol	3/Q			
		2,3,4-Trichlorophenol	3/Q			
		2,3,5-Trichlorophenol	3/Q			
		2,4,5-Trichlorophenol	3/Q			
		2,4,6-Trichlorophenol	3/Q		2/A	14,16
		2,4-Dimethyl phenol	3/Q		2/A	14,16
		2,4-Dinitrophenol	3/Q		2/A	14,16
		2,4-Dichlorophenol	3/Q		2/A	14,16
		2,6-Dichlorophenol	3/Q			
		4,6-Dinitro-o-cresol	3/Q		2/A	14,16
		2-Chlorophenol	3/Q		2/A	14,16
		4-Chloro-3-methylphenol	3/Q			
		4-Nitrophenol	3/Q		2/A	14,16
		m-Cresol	3/Q			
		o-Cresol	3/Q			
		p-Cresol	3/Q			
		Pentachlorophenol	3/Q		2/A	14,16
		Phenol	3/Q		2/A	14,16
21	Extractables, Phenoxy Acid Herbicides					
22	Extractables, Organochlorine Pesticides					
23	Extractables, Neutral Chlorinated	1,2,3,4-Tetrachlorobenzene	3A		2/A	14,16
		1,2,3,5-Tetrachlorobenzene	3A			
		1,2,4,5-Tetrachlorobenzene	3A			
		1,2,3-Trichlorobenzene	3A			
		1,2,4-Trichlorobenzene	3A		A	7,8,9,10,11
		2,4,5-Trichlorotoluene	3A			
		Hexachlorobenzene	3A		2/A	14,16
		Hexachlorobutadiene	3A		2/A	14,16
		Hexachlorocyclopentadiene	3A		A	7,8,9,10,11
		Hexachloroethane	3A		2/A	14,16

TABLE A-9 (Cont.)

Analytical Test Group						
No.	Name	Characterization Parameters	Ontario$^{(a)}$	U.S. EPA$^{(b)}$	Monitoring Requirement	Permit(s) with Requirement$^{(c)}$
		Octachlorostyrene	3A			
		Pentachlorobenzene	3A			
24	Chlorinated Dibenzo-p-dioxins and Dibenzofurans	2,3,7,8-Tetrachlorodibenzo-p-dioxin	3A			
		Octachlorodibenzo-p-dioxin	3A			
		Octachlorodibenzofuran	3A			
		Total heptachlorinated dibenzo-p-dioxins	3A			
		Total hexachlorinated dibenzofurans	3A			
		Total hexachlorinated dibenzo-p-dioxins	3A			
		Total heptachlorinated dibenzofurans	3A			
		Total pentachlorinated dibenzo-p-dioxins	3A			
		Total pentachlorinated dibenzofurans	3A			
		Total tetrachlorinated dibenzo-p-dioxins	3A			
		Total tetrachlorinated dibenzofurans	3A			
25	Solvent Extractables	Oil and grease	3/W		5/W	21
26	Fatty and Resin Acids					
27	PCBs	PCBs (Aroclors)	3A		2/A	14,16
	Additional Requirements	Toxicity testing	M			
		Flow	C	5A	C	2,3,20,21,25,26 27,28,29,30,31, 32,33,34
	Additional State or U.S. EPA Requirements	Acridine				
		Aldrin			2/A	14,16
		Benzidine			A	7,8,9,10,11
		Bis chloromethyl ether		5A		
		BOD5 % removal			2/W	24
		Carbonaceous BOD			2/W	5
		Chloride			2/W	12
		4-Chloro-n-cresol			2/A	14,16
		Dichlorodiflouromethane		5A		
		p,p'-DDD			2/A	14,16
		p,p'-DDE			2/A	14,16
		p,p'-DDT			2/A	14,16
		Diethyl phthalate			2/A	14,16
		Dimethyl phthalate			2/A	14,16

TABLE A-9 (Cont.)

Analytical Test Group						
No.	Name	Characterization Parameters	Ontario[a]	U.S. EPA[b]	Monitoring Requirement	Permit(s) with Requirement[c]
		Dieldrin			2/A	14,16
		Dissolved oxygen			D	8
		1,4-Dioxane				
		Endosulfan sulfate			2/A	16
		Endrin aldehyde			2/A	16
		Fecal coliforms		5A	W	28,33,34
		Free cyanide			2/W	27
		First stage oxygen demand (FSOD)			2/W	24
		Fluoride		5A	2/W	17
		Hydrogen sulfide			2/W	26
		Heptachlor			2/A	14,16
		Heptachlor epoxide			2/A	14,16
		Iron		5A	W	28,33
		Un-ionized ammonia			2/W	2,3
		Isophorene			2/A	14,16
		Manganese		5A	W	33
		MBAS			W	28
		Nitrobenzene			2/A	14,16
		2-Nitrophenol			2/A	14,16
		Temperature		5A	C	2
		Thermal load			M	11
		TSS % removal			2/W	24
		Vinyl bromide				
		BOD5		5A	2/W	21
		1,1,1 Trichloroethane		5A	Q	7,8,9,10,11
		Dibromomethane			Q	7,8,9,10,11
		Ethyl chloride			Q	7,8,9,10,11
		2-Chloroethylvinylether			Q	7,8,9,10,11
		Total dissolved solids			W	7
		3,3'-Dichlorobenzidine			2/A	14,16